4 You feel warm when you put your hands near a lighted light bulb.

5 The sound energy produced from the blender is a lost energy.

6 The thermal energy produced from the electric heater isn't lost energy.

10 What happens if?

1 You rub your hands? (According to energy changes)

2 You switch on an electric bulb? (According to energy changes)

3 You operate an electric fan? (According to energy changes)

4 You operate your mobile device for a long time?

Concept 2 About Fuel

1 Summary of Concept 2

- The Sun is considered the main source of energy.
- Fuel stores chemical energy inside it.
- Fuel is a material that releases thermal energy when burned.

Uses of fuel:

Gasoline or natural gas
are used in operating all means of transportation.

Oil, natural gas, or coal
are used in generating electricity.

Coal or wood
are used in warming houses.

Coal, natural gas, or wood
are used in cooking food.

Cars and fuel

- A car needs fuel to move.
- As the speed of the car increases, the amount of used fuel increases.
- If the fuel runs out, the car will stop.

How is a car operated ?

1. Gasoline burns inside the car's engine. (Thermal energy)
2. The car's engine rotates the wheels of the car. (Kinetic energy)

Types of fuel:

1 Biofuel Renewable resource	2 Fossil Fuel Nonrenewable resource
• It is the fuel that is made from living things that can be planted	• It is the fuel that was formed from the remains of plants and animals that lived millions of years ago. • Fossil fuel is extracted from underground.
Examples	
1 Wood (The most ancient fuel) 2 Grass 3 Corn 4 Charcoal (Made from wood) 5 Liquid fuel (Made from corn, grass, and wood chips)	1 Coal (Decomposition of the remains of ancient plants) 2 Oil and natural gas (Decomposition of marine animals) 3 Gasoline (Formed from oil)
Disadvantages	
• To get it, it requires cutting down trees which may lead to deforestation.	• Burning fossil fuel produces carbon dioxide gas that may cause air pollution, acid rain and global warming.

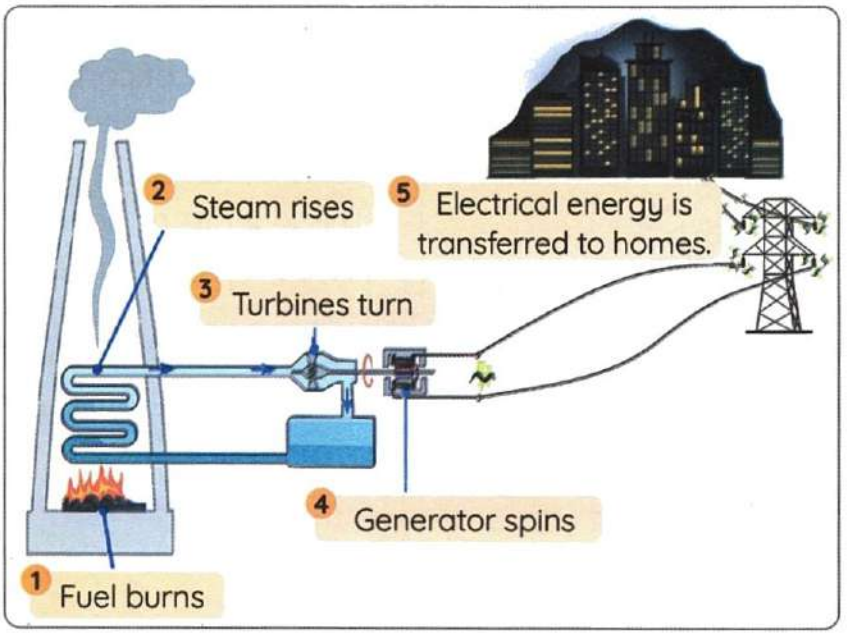
How do we conserve fossil fuel ?

1 Walking or biking instead of driving a car.
2 Turning off the lights when you aren't in a room.
3 Replacing fossil fuel with renewable energy resources.

1 Acid Rain	2 Global Warming
Way of Formation	
• Carbon dioxide gas combines with water in the air to form acid rain.	1 The amount of carbon dioxide gas in the air increases forming a layer in the atmosphere. 2 This layer traps heat on the Earth, raising Earth's temperature.
Disadvantages	
1 Trees die. GR Due to the chemical changes in the structure of the soil. 2 Fish die. GR Due to the chemical changes in the structure of the lakes. 3 Decomposition of some rocks	• Increasing the Earth's temperature.

1 Water	2 Oil
Similarity	
• They're used to generate electricity.	
Differences	
• Renewable resource of energy	• Nonrenewable resource of energy
• We must use water carefully and not waste or pollute it. • If we waste or pollute water, it may not be replaced as quickly as we need.	Formation of oil: 1 Marine organisms died millions of years ago. 2 Layers of sediments and rocks cover the remains. 3 Over time, those remains are converted into oil due to extreme heat and pressure.

Generating Electricity Using Fossil Fuel



1 Fuel burns

- When fuel (coal, oil, or natural gas) burns, it releases thermal energy.

2 Steam rises

- This thermal energy is used to heat water to produce steam.

3 Turbines turn

- The steam is directed to tubes to turn turbines.

4 Generator spins

- Turbines make the generator spin and convert kinetic energy into electrical energy.

5 Electrical energy is transferred to homes

- Electrical energy travels through cables to homes and factories.

How do we conserve electricity ?

1. Turning off the lights we don't need.
2. Unpluging electrical appliances after using them.
3. Setting a regular electricity-free time.

2 Definitions of Concept 2

Gasoline pointer	It's a device that helps the driver of the car check the amount of fuel.
Gasoline	It's a liquid that forms from oil and is used in moving cars.
Fuel	It's a material that releases thermal energy when it is burned.
Chemical energy	It's a kind of energy stored in fuel.
Thermal energy	It's the energy released from burning fossil fuel.
Renewable resources	• They are natural resources that are can be renewed after a short time of being used. • They are energy resources that include solar energy and hydroelectricity.
Nonrenewable resources	• They are energy resources that are used at a faster rate than they can be replaced. • They're energy resources that include all kinds of fossil fuel.
Biofuel	It is a type of fuel that is made from the living organisms that can be planted.
Fossil Fuel	• It is a type of fuel that is extracted from deep ground under the Earth's surface. • It is a type of fuel that is formed by the decomposition of old, dead organisms buried under the ground.
Oil and Natural gas	They are types of fossil fuel produced the decay of dead marine organisms (sea creatures).
Coal	It is a type of fossil fuel produced from the decomposition of ancient dead plants and trees.

Extreme heat and pressure	They're the factors needed for the formation of fossil fuel.
Charcoal	It is a kind of biofuel that is made from the wood of trees.
Liquid fuel	It is a kind of biofuel that is made from corn, grass and wood chips.
Wood	It is the oldest fuel that ancient people used.
Deforestation	It's a phenomenon that results from cutting trees at a faster rate to get wood.
Generator	It's a device that changes kinetic energy into electrical energy in electric power stations.
Carbon dioxide gas	It's a gas that causes global warming and acidic rains.
Global warming	It is a phenomenon in which the Earth's temperature increases when carbon dioxide gas increases in the air.
Acid rain	It is formed when carbon dioxide mixes with water in the air, and it causes the decomposition of some rocks and the death of trees.

3 Give Reasons for... Concept 2

1. Gasoline is very important for cars to move.
   - Because gasoline burns inside the car engine, allowing the engine to rotate the wheels.
2. The gasoline pointer is very useful for drivers.
   - To help the driver check the amount of gasoline (fuel) in the car.
3. Coal and wood are very important for warming houses.
   - Because they produce thermal energy when burned.

4 Biofuel is a renewable resource of energy.
- Because it is renewed with the continuous growth of plants.

5 Fossil fuel is a nonrenewable resource of energy.
- Because it starts to run out as we use it and can't be renewed easily.

6 Biofuel has a negative effect on the environment.
- To get biofuel, it requires cutting down trees, which may lead to deforestation.

7 Fossil fuel has a negative effect on the environment.
- Because burning fossil fuels produces carbon dioxide, which increases air pollution and causes global warming.

8 Using coal or natural gas in electric power stations.
- To get the thermal energy needed to heat water and produce steam.

9 It is necessary to conserve fossil fuel.
- To reduce air pollution.

10 Walking or biking is better than driving cars.
- To reduce the amount of burning fossil fuel and reduce air pollution.

11 Water is a renewable resource of energy.
- Because it is available and hasn't run out yet.

12 We must use water carefully, and not waste or pollute it.
- Because if we waste or pollute water, we can't replace it as quickly as we need.

13 We should conserve electricity.
- To avoid burning more fossil fuels and air pollution.

14 Generators play an important role in the electric power stations.
- Because generators convert kinetic energy into electrical energy.

15 Turbines play an important role in electric power stations.
- Because the kinetic energy of turbines is used to spin generators.

16 Engineers work on improving solar vehicles.
- To reduce the burning of fossil fuel of normal vehicles and reduce air pollution.

17 Smog has a bad impact on the human's respiratory system.

- Because smog consists of small harmful particles that irritate the lungs and cause damage to lung tissues.

18 Formation of acid rain.

- Because carbon dioxide gas combines with water in the air to form acid rain.

19 Acid rain has many negative effects on the environment.

Because acid rain may cause:

1- The death of trees. 2- The death of fish.

3- The decomposition of some rocks, including bricks of buildings.

4 What Happens if...? Concept 2

1 The car's engine runs out of fuel.

- The car will stop.

2 We cut down trees at a fast rate to get wood.

- It leads to deforestation.

3 The remains of plants decompose over millions of years.

- Coal will be formed.

4 The remains of sea animals decompose over millions of years.

- Oil or natural gas will be formed.

5 We waste water or pollute it.

- We may not be able to replace it as quickly as we need.

6 Generators are turned on.

- Generators change kinetic energy into electrical energy.

7 A person is exposed to smog.

- Smog will irritate his/her eyes and lungs.

8 Carbon dioxide gas forms a layer in the atmosphere.

- Global warming happens because Earth's temperature increases slowly.

5 Revision on Concept 2

1 Choose the correct answer:

1. All the following are found deeply under the Earth's surface, except _____ .
   a. coal **b.** oil **c.** natural gas **d.** green plants
2. _____ energy is stored inside coal.
   a. Thermal **b.** Solar **c.** Chemical **d.** Electrical
3. If we are going on a long road trip, we must check the _____ .
   a. seats **b.** doors **c.** speedometer **d.** gasoline pointer
4. Fuel is used as a source of _____ energy.
   a. thermal **b.** chemical **c.** light **d.** solar
5. All the following are extracted from underground, except _____ .
   a. coal **b.** charcoal **c.** petroleum **d.** natural gas
6. _____ is a renewable resource of energy.
   a. Oil **b.** Coal **c.** Gasoline **d.** Corn
7. Coal is formed underground due to the decomposition of dead _____ .
   a. plants **b.** animals **c.** humans **d.** birds
8. _____ takes millions of years to be formed.
   a. Coal **b.** Charcoal **c.** Wood **d.** Corn
9. One of the disadvantages of overusing biofuel is _____ .
   a. overfishing **b.** wildfire **c.** deforestation **d.** acid rain
10. Both water and oil _____ .
    a. are renewable resources **b.** are nonrenewable resources
    c. have the same structure **d.** can be used to generate electricity
11. By heating water, it turns into _____ .
    a. steam **b.** ice **c.** electricity **d.** fuel

12 The steam produced in the electric power station is directed into tubes to turn the ..... .

a. turbines b. motors c. mills d. lamps

13 Electrical energy travels through ..... to homes and factories.

a. tubes b. motors c. cables d. fans

14 ..... and ..... are included in fossil fuel formation.

a. Heating - cooling b. Burying - cooling
c. Decaying - heating d. Decaying - growth

15 Smog damages the tissues of the ..... system.

a. digestive b. circulatory c. respiratory d. nervous

16 Cars' smog causes irritation of humans' ..... .

a. small intestines b. brains c. hearts d. eyes

17 Acid rain is formed when ..... combines with water.

a. oxygen b. carbon dioxide
c. hydrogen d. nitrogen

18 Using ..... to produce electrical energy is expensive.

a. solar energy b. oil c. natural gas d. coal

19 Burning fossil fuel causes all the following, except ..... .

a. pollution b. acid rain c. global warming d. deforestation

2 Put (✓) or (✗):

1 As the speed of the car increases, the amount of the used fuel decreases. ( )

2 We cannot drive a car if the gasoline inside the fuel tank runs out. ( )

3 Thermal energy is produced by burning a piece of wood. ( )

4 Cars, buses, and bicycles need gasoline to run on roads. ( )

5 Coal is the oldest fuel that has been used all over the world by ancient people. ( )

6 Fossil fuel is made from living things that can be grown. ( )

7 The consumption rate of coal is slower than its formation rate. ( )

8 Water may not be replaced as quickly as we need. ( )

9 Some plants are used to make liquid biofuel. ( )

10 The movement of a generator in an electric power station produces potential energy. ( )

11 Turbines are operated by steam in electric power stations. ( )

12 Using energy-saving light bulbs conserves electricity. ( )

13 On cooling water, it turns into steam in electric power stations. ( )

14 Pesticides cause soil and water pollution. ( )

15 When the burning of fossil fuel increases, the temperature on Earth decreases. ( )

16 Mixing water with oxygen gas produces acid rain. ( )

17 The amount of fossil fuel on Earth is unlimited. ( )

3 Write the scientific term:

1 It's a device that helps the car driver check the amount of fuel. (.....)

2 It's a liquid fossil fuel that burns inside the car engine. (.....)

3 It's a kind of energy that is stored in fuel. (.....)

4 It's a form of energy produced by burning fuel. (.....)

5 It's a material that releases thermal energy on burning. (.....)

6 It is a natural resource that is used faster than it can be replaced. (.....)

7 It is a natural resource that can be replaced soon after it is used. (.....)

8 It is the fuel that is made from living organisms that can be planted. (.....)

9 It is the fuel that is extracted from deep ground under the Earth's surface. (.....)

10 It's a kind of fossil fuel that is produced from the decomposition of dead marine organisms. (.....)

11 It's a kind of fossil fuel that is produced from the decomposition of dead plants. (.....)

12 It's a kind of biofuel that is made of the wood of trees. (.....)

13 It's a kind of biofuel that is made of corn and grass. (.....)

14 It's the energy produced by the generator. (.....)

15 It's a device that operates generators. (.....)

16 It's a device in the electric power stations that changes the kinetic energy into electrical energy. (.....)

17 It is a phenomenon in which the Earth's temperature increases when carbon dioxide gas increases in the air. (.....)

18 It is a phenomenon that causes the decomposition of some rocks and the death of trees. (.....)

19 It's a gas that causes global warming and acid rain. (.....)

4 Complete the following sentences:

1 Some forms of fuel, such as ..... and ....., can be used in warming houses.

2 Extreme ..... and ..... are the factors needed for the formation of fossil fuel underground.

3 Water is considered a ..... resource of energy, while oil is a ..... resource of energy.

4 Turbines in electric power stations are turned by ....., and they produce kinetic energy to run the ..... of the electric power stations.

5 The electric generator changes the ..... energy into ..... energy.

6 To avoid air pollution, we must use ..... resources of energy.

7 Smog causes ..... pollution.

8 Pesticides causes ..... and ..... pollution.

5 Complete the following using the words between the brackets:

(wood - deforestation - underground - oil)

1 Ancient people used ..... in cooking food and warming.

2 Gasoline is made from ....., while coal is extracted from ..... .

3 Cutting trees with a fast rate causes ..... .

6 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Chemical energy	a. is generated in electric power stations.
2 Kinetic energy	b. is stored inside fuel.
3 Thermal energy	c. is produced when the car wheels rotate.
4 Electrical energy	d. is produced when burning a piece of coal.

1 ..... 2 ..... 3 ..... 4 .....

B

Column (A)	Column (B)
1 The Sun	a. takes a very long time to be formed.
2 Fossil fuel	b. takes a short time to be formed.
3 Biofuel	c. is the primary source of all kinds of energy.

1 ..... 2 ..... 3 .....

C

Column (A)	Column (B)
1 Liquid fuel	a. was used by ancient people.
2 Gasoline	b. is made from grass, corn, and wood chips.
3 Charcoal	c. is a fuel that is made from oil.
4 Wood	d. is made from wood.

1 ..... 2 ..... 3 ..... 4 .....

D

Column (A)	Column (B)
1 Generators	a. produces thermal energy.
2 Turbines	b. produce electrical energy.
3 Burning fuel	c. is produced from heating water.
4 Steam	d. produce kinetic energy.

1 ..... 2 ..... 3 ..... 4 .....

7 Cross out the odd word:

1. Wood – Oil – Corn – Charcoal (.....)
2. Sun – Wind – Water – Coal (.....)
3. Coal – Charcoal – Natural gas – Oil (.....)

8 Give reasons for:

1. The fuel (gasoline) pointer is very useful for drivers.

.....

2. Fossil fuel is considered a nonrenewable resource of energy.

.....

3. Biofuel is considered a renewable resource of energy.

.....

4. Generators play an important role in electric power stations.

.....

5. The fossil fuel amount on Earth is limited.

.....

6. Engineers work on improving solar vehicles.

.....

9 What happens if?

1. We burn a piece of coal?

.....

2. We cut down trees at a faster rate than they can grow?

.....

3. Oil is burned inside electric power stations?

.....

4. Water is heated in electric power stations?

.....

5. Acid rain falls on buildings?

.....

Concept 3 Renewable Energy Resources

1 Summary of Concept 3

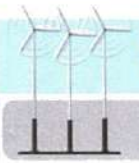
Renewable resources of energy — They are natural resources that are replaced (renewed) at a faster rate than they are consumed.

First: Wind Energy

- In the past, people needed machines to make their lives easier.

1 Windmill	2 Watermill
Way of Working	
1 The wind moves the mill's blades. 2 The kinetic energy is transferred to the internal parts of the mill.	1 The water moves the mill's blades. 2 The kinetic energy is transferred to the internal parts of the mill.
Importance	
• They are used to crush (grind) grains and make flour.	
Advantages	
• Low cost	• Renewable energy resources
Disadvantages	
• Sometimes the wind doesn't blow, so it can't do its main job.	• Sometimes, the water supply may dry up, so it can't do its main job.

Modern turbines are used now instead of old windmills.



1 Modern Wind Turbines	2 Old Windmill

Function

• Generating electricity	• Grinding the grains to make flour

Differences

• They are **taller than** windmills. • They have **fewer** blades than windmills. • The blades have **no openings**.	• They are **shorter** than wind turbines. • They have **more** blades than wind turbines. • The blades have **openings**.

Similarity

• They depend on the kinetic energy of the wind to operate.

Generating Electricity Using the Wind

1. **Solar energy** causes the air to move and the wind to blow.
2. The kinetic energy of the **wind** rotates the blades of the **wind turbines** that are used to spin the generators.
3. The **generators** change kinetic energy into electrical energy.
4. **Electricity** is transferred through big wires towards cities to light houses and streets.

Second: Water Energy

Hydroelectricity: (Hydroelectric energy)

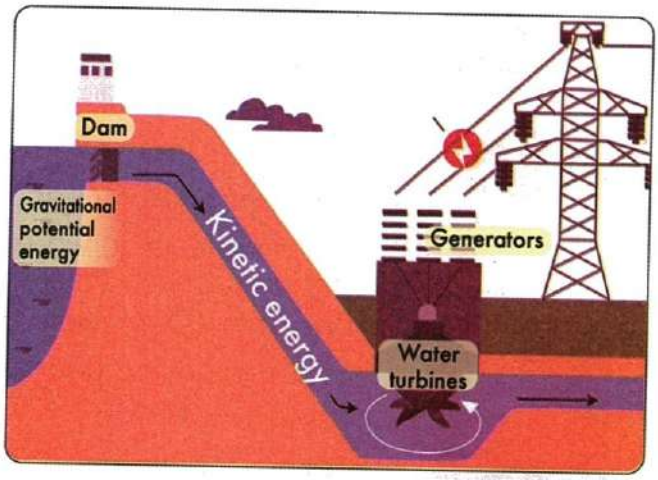
- It is a type of electrical energy generated by water turbines in dams.

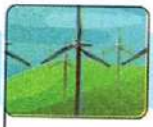
Dams are built on rivers to

- control the flow of water.
- increase the potential energy of water.

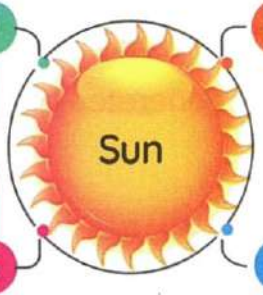
How can water be used to generate electricity ?

1. A hydroelectric dam holds back the flow of water to increase its potential energy.
2. When the water is released, it passes through the blades of turbines, so they rotate.
3. Turbines operate the generators, so kinetic energy is converted into electrical energy.
4. Electricity is transferred to cities through long electric wires.



P.O.C	 1 Wind Turbines	2 Water Turbines
Differences	• They are placed in windy places.	• They are placed in places where dams are built on rivers.
Similarities	1 Both of them are **renewable resources**. 2 Both of them use **kinetic energy** to turn turbines. 3 Both of them are used to **generate electricity**.	

Third: Solar Energy



1. It is the main source of all kinds of energy on Earth.
2. The sunrays are called radiant energy (radiation).
3. The Sun provides us with light and heat.
4. The energy received from the Sun is called solar energy.

Uses of Solar Energy

- We can use solar energy as a source of thermal energy

1 Greenhouses

Importance:

- They help farmers plant the crops that need warm climates.

How does it work?

1. A greenhouse allows the entry of light and radiant energy from the Sun.
2. Radiant energy changes to thermal energy inside it.
3. Thermal energy warms the greenhouse from inside.

2 Warming

a. Warming Ourselves
- When exposing yourself to the Sun, you feel warm.

b. Warming Houses
- By placing large windows on the wall that faces the sun.

3 Concave mirrors

- They collect and focus the sunlight to heat a metal pot and cook the food inside.

4 Solar water heater

Structure: It contains panels made of black pipes.

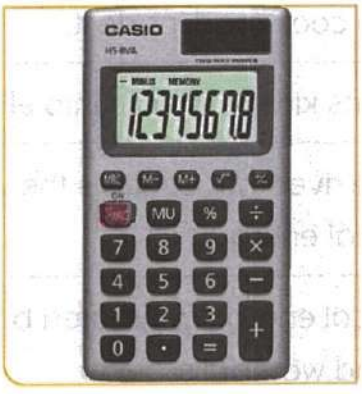
Location: It can be placed on the roof of a house.

How does it work?

1. As water passes through the pipes, it heats up.
2. Water can then be stored in a hot water tank to be used later.

Solar Panels

Structure	• They consist of a large number of small solar cells.
Idea	• Solar cells capture the radiant energy coming from the Sun and turn it directly into electricity.
Size	• Very small to supply only one light bulb with energy • Very large to supply buildings or cities with energy
Uses	Most solar panels are used to generate electricity to: 1 Light houses and streets. 2 Operate electric devices. 3 Recharge batteries of solar-cell calculators. 4 Power irrigation equipment in some villages.



2 Definitions of Concept 3

Renewable energy resources	They are energy resources that include wind energy and water energy.
Old windmill	It's a machine that used the kinetic energy of the wind to grind grains to make flour.
Watermill	It's a machine that used the kinetic energy of the water to grind grains to make flour.
Modern wind turbines	They use the kinetic energy of the wind to generate electricity.
Solar panels	They are composed of many solar cells. They absorb solar energy (sunlight) and convert it into electrical energy.
Greenhouse	It's a structure that helps farmers to plant crops that need warm climate.
Concave mirror	It's a mirror used to direct and focus sunrays toward the metallic pot used to cook food inside it.
Generator	It's a device that turns kinetic energy into electrical energy.
Dam	It's a building on the river that controls the water flow and increases its potential energy.
Hydroelectricity	It's a type of electrical energy generated by water turbines in dams and waterfalls.
Evaporation	It's a process in which water changes into water vapor.
Condensation	It's a process in which water vapor changes into water.

3 Give Reasons for... Concept 3

1. **People use machines.**
   - To make their life easier and do tasks faster.
2. **Solar energy is a renewable resource of energy.**
   - Because solar energy is the energy that will not run out as we use it.
3. **People used windmills and watermills 400 years ago.**
   - To grind grains to make flour.
4. **People now use modern wind turbines.**
   - To generate the electricity needed to light houses and operate different devices.
5. **Using windmills and watermills has a lot of advantages.**
   - Due to their low cost and because they depend on renewable resources.
6. **Using windmills and watermills has great disadvantages.**
   - Sometimes the wind does not blow or the water supply may dry up.
7. **We feel the warmth of the Sun at night.**
   - Because the atmosphere, water and soil absorb heat energy from the Sun.
8. **Greenhouses help farmers in the agricultural field.**
   - Because they help farmers in planting crops that need warm weather.
9. **We place large windows on the wall that faces the Sun.**
   - To enable the energy of the Sun to warm the house.
10. **Concave mirrors are used in cooking.**
    - To direct the sunrays towards the cooking pans to cook food inside them.
11. **The panels made of black pipes can be placed on the houses' roofs.**
    - To heat water, then store it in a hot water tank.
12. **Solar panels are used in generating electricity for lighting houses and streets.**
    - Because they convert solar energy into electrical energy.
13. **The Sun is the main source in generating electricity from windmills.**
    - Because the Sun warms the Earth and the wind. Different parts of the world get different amounts of solar energy. This causes the blowing wind to rotate the blades of the windmills.

14 Dams are built on rivers.
- To control the flow of water and increase the gravitational potential energy of water to generate electricity.

15 Water returns to rivers after flowing.
- Because water evaporates, then it condensates in the form of clouds and returns to the rivers in the form of rain.

16 Renewable resources of energy are considered clean resources of energy.
- Because they don't need burning fossil fuel to generate electricity, so they don't pollute the environment.

17 There are conditions required for wind turbines to work with high efficiency.
- Because they should exist in windy regions.

4 What Happens if...? Concept 3

1 Wind doesn't blow in an area that contains many wind turbines.
- The wind turbines will not move, so they can't generate electricity.

2 Water falls on the blades of water turbines.
- The blades will rotate, so they can generate electricity.

3 The force of wind increases in an area that contains many wind turbines.
- The blades rotate faster, and the efficiency of the wind turbines increases.

4 Sunlight falls on a greenhouse.
- Radiant energy changes to thermal energy inside the greenhouse which warms the greenhouse from inside.

5 Sunlight falls on a concave mirror.
- The concave mirror focuses the sunlight on the cooking pot to cook food inside it.

6 Sunlight falls on a solar-cell calculator.
- It changes solar energy to electrical energy to charge its batteries.

7 Water is released from a dam.
- The gravitational energy of water changes into kinetic energy to rotate the water turbines and generate electricity.

5 Revision on Concept 3

1 Choose the correct answer:

1. All the following are considered renewable resources of energy, except ..... .
   a. wind b. coal c. the Sun d. water
2. The main function of ..... is grinding the grains and making flour.
   a. modern turbines b. solar panels
   c. dams d. watermills
3. Both modern wind turbines and old windmills are similar in their..... .
   a. blades number b. ways of working
   c. heights d. blades shape
4. Modern turbines are ..... than old windmills.
   a. longer b. shorter c. heavier d. slower
5. The source of all energies on Earth is ..... .
   a. wind b. the moon c. the Sun d. water
6. In winter, greenhouses help farmers grow plants that need ..... .
   a. warm weather b. cold weather
   c. less water d. less sunlight
7. Solar panels can be used operate all the following, except ..... .
   a. a calculator b. a gas oven
   c. irrigation equipments d. street lights
8. The ..... energy of the Sun causes air movements and wind blowing.
   a. chemical b. radiant c. electrical d. sound
9. The electricity from wind turbines is transmitted into houses and factories through ..... .
   a. the wind b. devices c. generators d. wires
10. Hydroelectric power is produced using ..... .
    a. air b. water c. soil d. plants
11. Water of rivers stores great ..... energy at the top of the waterfalls.
    a. kinetic b. potential c. electrical d. light
12. The power source for the electric fan is ..... .
    a. wind b. water c. heat d. electricity

2 Put (✓) or (✗):

1. Windmills can do their job all the time, as the wind never stops blowing. ( )
2. When the kinetic energy of the wind increases, the windmill blades spin faster. ( )
3. Both modern wind turbines and old windmills are used to generate electricity. ( )
4. Electricity generated by wind turbines is transmitted through the wind. ( )
5. The power source for the electric fan is wind. ( )
6. Wind turbines convert kinetic energy into electrical energy. ( )
7. We use solar energy to preserve food. ( )
8. We feel the warmth of the Sun during the day only. ( )
9. A solar cell consists of a large number of small solar panels. ( )
10. A calculator's output energy is solar energy. ( )
11. Small solar panels may be able to light buildings. ( )
12. The flow of water in dams can be controlled to generate electricity. ( )
13. Electricity generated from water is called hydroelectricity. ( )
14. Rivers store kinetic energy. ( )
15. The electricity produced by water is known as electromagnetic energy. ( )

3 Write the scientific term:

1. They are energy resources that include wind energy and water energy. (.....)
2. They are used to collect and focus sunrays towards the cooking pots. (.....)
3. It's a device that the wind rotates its blades to generate electricity. (.....)
4. It's a device that consists of black pipes used to heat water. (.....)
5. It's the device in an electric power station that turns kinetic energy into electrical energy. (.....)

6 It's a structure on the river that controls the flow of water and increases the potential energy of water. (.....)

7 It's a type of electrical energy generated by water turbines in dams. (.....)

4 Complete the following sentences:

1 When the wind turbines rotate, ... energy is converted into ..... energy.

2 Both wind and water movements produce ..... energy, which is used to rotate turbines to generate ..... energy.

3 The number of blades in modern wind turbines is ..... than in old windmills.

4 We can use solar energy in cooking using concave ....., which collect and focus the ..... onto the metal pots to heat them.

5 ..... help farmers grow crops that need warm weather.

6 Solar energy causes the air to ..... and the wind to ..... .

7 Electricity is transferred to cities through ..... .

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Greenhouses	a. are used in heating water.
2 Concave mirrors	b. are used in planting some kinds of crops.
3 Panels of black pipes	c. are used in cooking food.

1 ..... 2 ..... 3 .....

6 Study the following figures, then complete the sentences below:

Figure (1)

Figure (2)

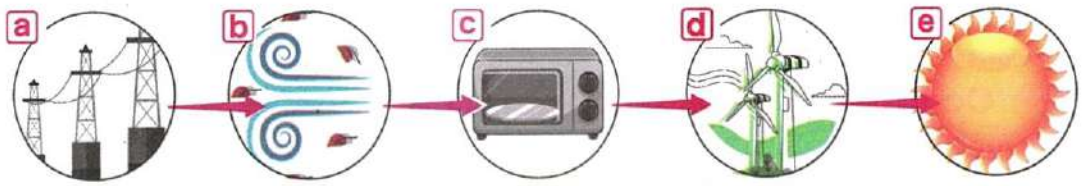
1 Figure (.....) is used to grind grains.

2 The machine in figure (.....) is shorter than the machine in figure (.....).

3 Both of them are similar in ..... .

4 Both of them depend on ..... .

7 To generate electricity, arrange the following figures from start to end:



....

8 Give reasons for:

1. People used windmills and watermills 400 years ago.

.....

2. People now use modern wind turbines.

.....

3. You feel the warmth of the Sun at night.

.....

4. Greenhouses are very important to farmers.

.....

5. Generators have an important role in electric power stations.

.....

6. Dams are built on rivers.

.....

9 What happens if?

1. Wind doesn't blow in an area that has wind turbines?

.....

2. The kinetic energy that is applied on the wind turbines increases?

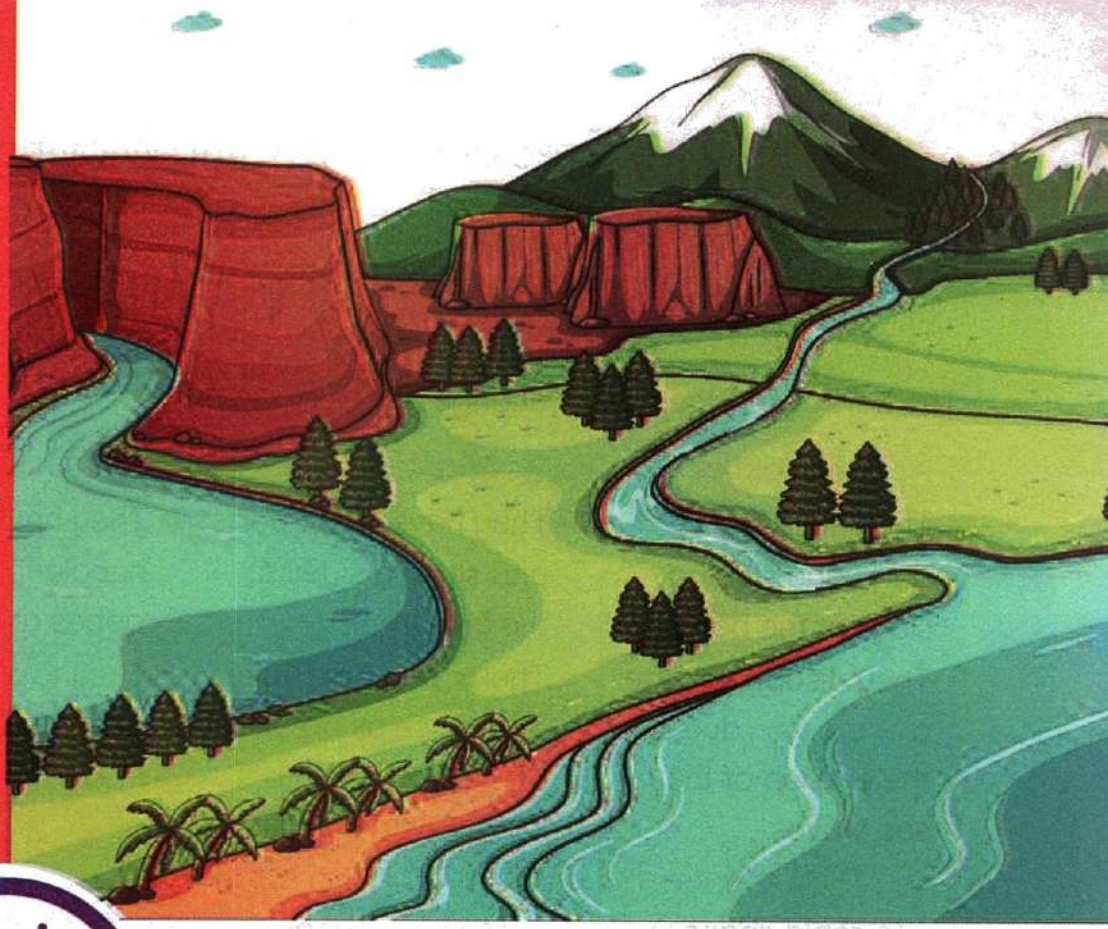
.....

3. The water of dams becomes free?

.....

Theme 4

Change and Stability



Unit 4

Shifting Surfaces

Unit Concepts:

Concept 1 Breaking Down and Moving Rocks

Concept 2 Changing Landscapes

Concept 1 Breaking Down and Moving Rocks

1 Summary of Concept 1

- The Earth's surface always changes.

Sandcastles

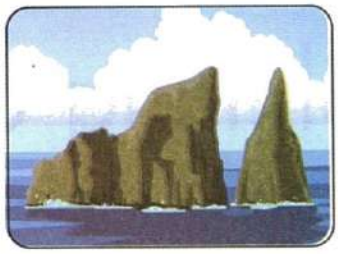
- They have steep parts and sloping sides at the bottoms.
- They disappear after a short time due to the erosion of the sea waves.

(A rapid change)

Coastal rocks

- They have steep parts and sloping sides at the bottoms.
- There may be a little difference as breaking off some parts by wind or water after many years.

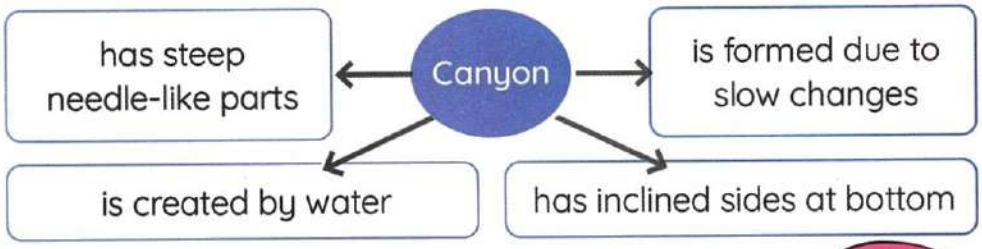
(A slow change)



Canyons

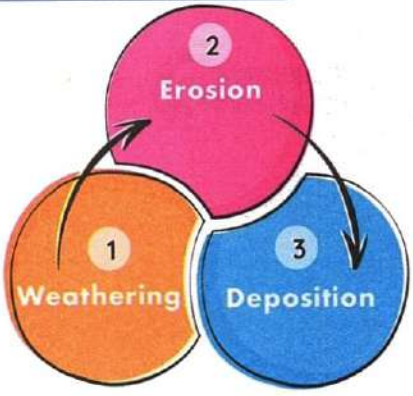
- They have steep needle-like parts with slopes at the sides.
- They take millions of years to be formed.

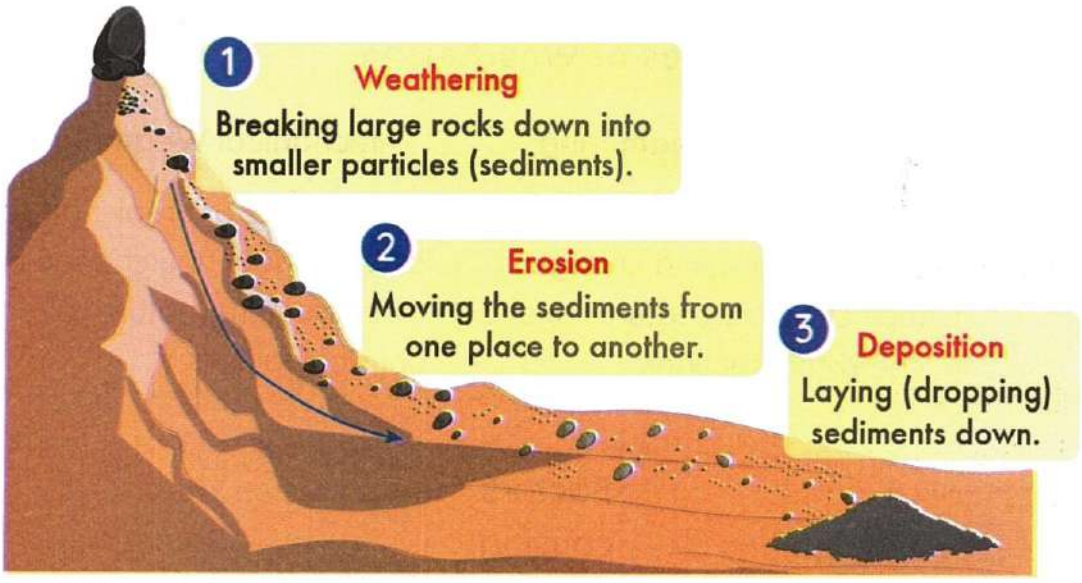
(A slow change)



Shaping the Earth's surface

- Wind, water, and weather conditions are the factors that cause changes of the Earth's surface.
- Earth's surface changes through three processes which are weathering, erosion, and deposition.





1 Weathering:

- The changing of the Earth's surface begins with the **weathering process**.

Weathering

Is the process of breaking down rocks into small (tiny) particles.

Enormous rocks (that makes up mountains) → are broken down into → **boulders** → are broken down into → **smaller rocks** → are broken down into → **sand**

Weathering may cause

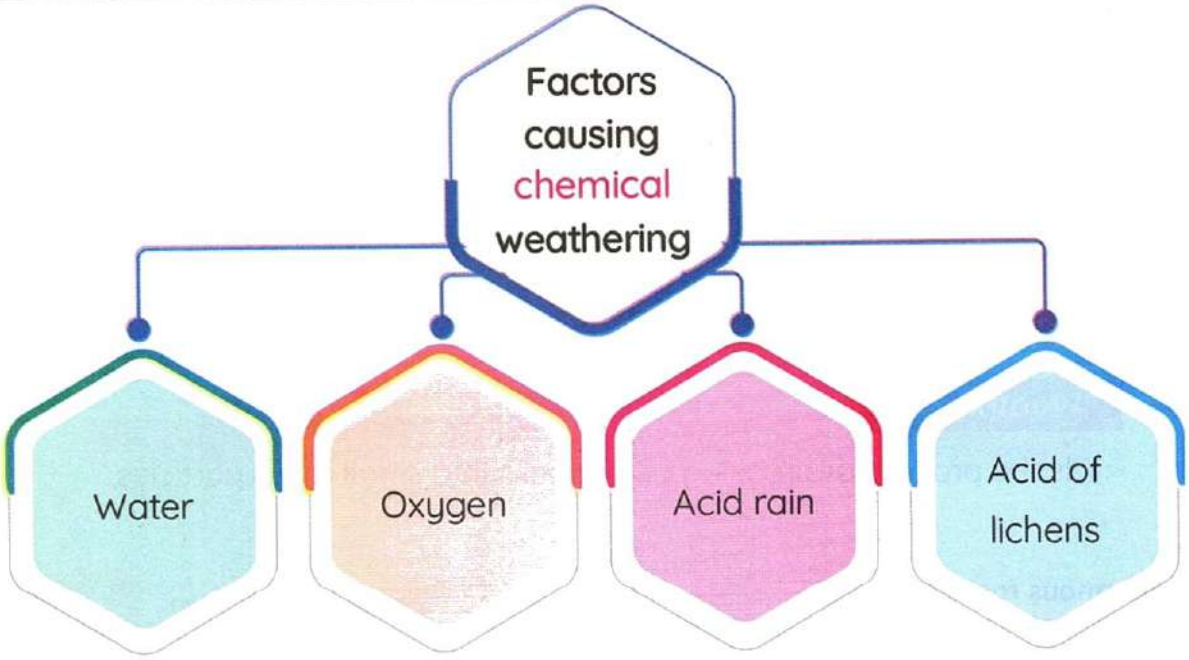
1. A breakdown (crumbling) of status.

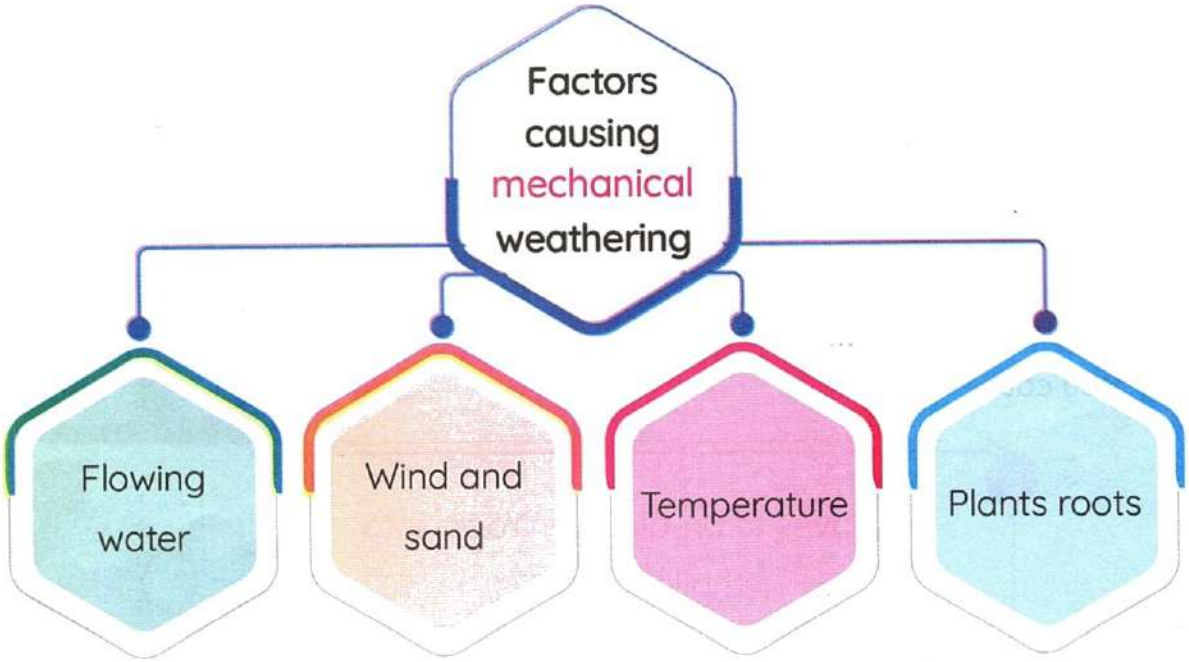
2. Paint to peel on a building.

3. Waves to break down rocks into smaller particles.

Types of Weathering

P.O.C	Chemical Weathering	Mechanical Weathering
Definition	• The process of breaking rocks down with a change in their structure (nature) due to chemical reactions.	• The process of breaking rocks down without any change in their structure (nature) due to physical factors.





Factors causing chemical weathering

1 Water

- Water dissolves minerals in the rocks, and then those dissolved minerals recombine again, forming new shapes, as in limestone caves.

2 Oxygen

- Oxygen in the air reacts with the iron in some rocks, forming red-colored rust that causes rocks to be weak and easily broken.

3 Acid rain

- Acid rain falls on rocks.
- These acids dissolve minerals in the rocks, so they become weaker and break down easily.

4 Acid of lichens

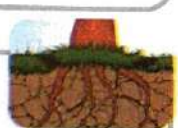
- Lichens produce acids on rocks.
- These acids dissolve minerals in the rocks, so they become weaker and break down easily.

Factors causing mechanical weathering

1 Flowing water

- Flowing water carrying some sand and gravel causes:

[a] Scouring edges off boulders.
[b] Breaking off large pieces of tumbled rocks due to collision with each other.

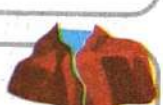


2 Plants roots

[a] Plant roots grow inside the cracks of rocks.
[b] Cracks become wider.
[c] Rocks are broken down.

3 Wind and sand

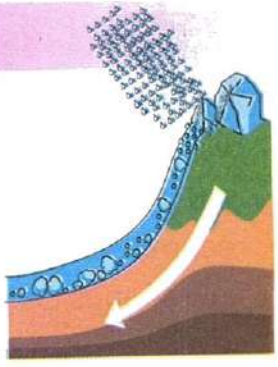
[a] Wind rushes sand on the rock surface.
[b] Friction occurs between sand and rocks.
[c] This causes the smoothing of rocks and the breaking down of them.



4 Temperature

[a] Water flows in the tiny cracks in the rocks.
[b] Water expands when it turns into ice, then melts.
[c] By repeated melting and freezing of water, cracks in rocks become wider, causing the rocks to be broken down.

2 Erosion:



Erosion

It is the process of moving sediments from one place to another.

- **Note:** Sediments are weathered sand, soil, and small rocks.

Factors causing erosion

A Gravity | B Wind | C Water

Factors causing erosion

A Gravity

- Gravity pulls rocks down mountainsides.

B Wind

- The wind carries grains of sand from one place to another, where:
  - Strong wind and hurricanes blow sand for long distances.
  - Gentle wind blows sand grains for short distances.

C Water

- **Rivers** and **floods** erode rocks and soil from their banks.
- **Waves** pull sand away from beaches.
- **Rain** washes the soil on hilly farmland downhills.

3 Deposition:

Deposition

It is the process of laying down eroded sediments in a new place.

1 Deposition by wind:

- As the wind blows, it picks up sand.
- Wind carries sand to another place.
- When the wind stops blowing, sand is deposited.

This forms:

a Small sand dunes on beaches.

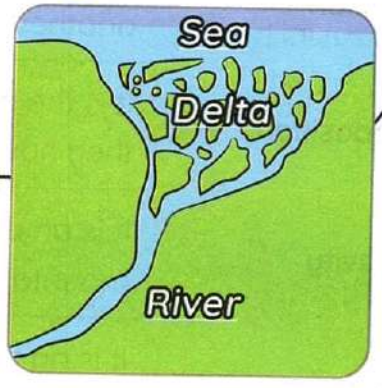
b Large sand dunes in desert.

2 Deposition by water:

- A river carries sediment eroded from its banks.
- When the river carrying sediments meets a sea, it deposits them.

This forms:

- A delta, such as Nile Delta



2 Definitions of Concept 1

Weathering	It is the process of breaking down rocks into smaller pieces.
Mechanical weathering	It is a type of weathering that breaks off rocks without changing its matter(structure).
Chemical weathering	It is a type of weathering that leads to the formation of a different material.
Lichens	They are tiny-like plants that live on rocks and produce acid on them, causing them to break down.
Oxygen gas	It is the gas that reacts with iron in rocks, forming a red-colored rust on some rocks.
Plant's roots	They are a part of the plant that grows in rocks' cracks, causing them to be broken.
Acid rain	It is a natural phenomenon that has the same effect as lichens on rocks.
Erosion	It is the process of moving sediment from one place to another.
Deposition	It is the process of settling sediments in a new place after they have been moved by erosion.
Gravity	It is an eroding factor that pulls the rocks down mountainsides.
River	It is an eroding factor that moves rocks from their banks downstream.
Sediments	They are pieces of weathered rocks that are moved by gravity, wind, water, or other factors.

3 Give Reasons for... Concept 1

1. **The Earth's surface is always changing.**
   - Because of many factors, such as wind, water, and weather.
2. **Wind is the main factor changing the Earth's surface.**
   - Because it can break down rocks and move small rocks to another place.
3. **Waves are from factors which can change landforms.**
   - Because waves can move small parts of sand from one place to another.
4. **Changes to the Earth's surface are different in the time of happening.**
   - Because some changes of the Earth surface happen quickly, such as the disappearance of sandcastles, while others take a very long time, such as formation of canyons.
5. **The shape of coastal rocks changes after many years.**
   - Because some parts of them may be broken off by water or wind.
6. **The main source of soil is big rocks.**
   - Because when the weathering process occurs, the big rocks break down into tiny rocks, then into pebbles or grains of sand.
7. **Oxygen gas has a bad effect on rocks.**
   - Because oxygen gas can react with iron in rocks forming red-colored rust which makes the rock weaker and breaks down easily.
8. **Plant roots may have a bad impact on rocks.**
   - Because as plant roots grow inside rocks, the cracks in the rocks become wider, so the rocks break down.
9. **Lichens have a bad impact on rocks.**
   - Because they produce acids as they grow on rocks that make the rock weaker and break off easily.
10. **There are some similarities between the effects of lichens and acid rain on rocks.**
    - Both of them can dissolve the rocks or changing their nature.
11. **Sand and wind team up to wear down large rocks.**
    - Because wind rushes sand on the surface of the rocks, it smoothes and breaks them down.
12. **It is hard to see weathering in action (in most cases).**
    - Because it takes a long period of time to happen.

13 Chemical weathering causes a greater change to rocks than mechanical weathering.
- Because chemical weathering forms completely new, different matter, while mechanical weathering breaks down rocks only.

14 Sometimes you can see erosion happening.
- Because sometimes we can see flash floods, hurricanes, or landslides.

15 Gravity is one of the eroding factors.
- Because gravity pulls rocks down mountainsides.

16 Erosion and deposition are linked processes.
- Because eroded rocks must be deposited over time.

17 The formation of a delta.
- As a result of the deposition process when a river meets a sea.

4 What Happens if...? Concept 1

1 The waves hit a sandcastle?
- The sandcastle will be gone (disappeared).

2 Water runs over rocks?
- Water will dissolve some minerals in rocks.

3 Oxygen in our atmosphere reacts with iron in the rock?
- A red-colored rust will be formed, so rocks are broken down more easily.

4 The continuous melting and freezing cycle of water inside rocks cracks?
- Water expands, causing the cracks in the rocks to become wider, so the rocks break off.

5 Acid rain falls on rocks?
- Acid rain will dissolve the minerals in rocks, so they become weaker and break down easily.

6 Lichens grow on the rocks?
- They produce acids that can break off rocks.

7 A plant's root grows inside rocks?
- The cracks become wider so rocks break down easily.

8 Rain falls on a hilly farmland?
- Rain will carry the weathered rocks and soil on farmlands.

9 Wind stops blowing (concerning the process happening to sand)?
- The deposition process will happen.

10 A river carrying sediments meets a sea?
- The deposition process happens and a delta may be formed.

5 Revision on Concept 1

1 Choose the correct answer:

1) Steep valleys formed due to flowing water erosion are called ..... .
   a. hills b. sand dunes c. canyons d. deltas

2) A canyon may take ..... to be formed.
   a. minutes b. hours c. days d. years

3) All the following are reasons for chemical weathering, except ..... .
   a. water b. plant roots c. acid rain d. oxygen gas

4) ..... may cause chemical or mechanical weathering.
   a. Lichens b. Oxygen c. Water d. Rocks

5) Which of the following examples represents mechanical weathering?
   a. Red-colored rust on rocks b. Acid rain falls on rocks.
   c. Roots grow inside rocks. d. Water dissolves minerals.

6) Sand is formed due to the breaking down of ..... .
   a. wood b. plastic c. glass d. rocks

7) Limestone caves are formed due to the combination of ..... .
   a. dissolved minerals b. insoluble minerals
   c. red-colored rust d. acid rain

8) ..... is the process by which sediments are carried to another place.
   a. Deposition b. Erosion c. Weathering d. Melting

9) Dissolving minerals from rocks to recombine with new substances is an example of ..... .
   a. mechanical weathering b. weathering by wind
   c. chemical weathering c. erosion

10) All the following are processes that change the Earth's surface, except ..... .
   a. erosion b. digestion c. weathering d. deposition

11) Lichens produce ..... that dissolve(s) minerals found in rocks.
   a. oxygen b. rain c. water d. acids

12 The process of breaking down rocks on the Earth's surface is called ..... .

a. erosion b. weathering c. decomposition d. deposition

13 The force of ..... pulls rocks from the top of the mountain to its bottom.

a. river water b. seawater c. rainwater d. gravity

14 ..... erode(s) rocks and soil from their banks.

a. Rivers b. Mountains c. Rainwater d. Gravity

15 When a river carrying sediments meets a sea, a ..... is formed.

a. sand bar b. sand dune c. delta d. sand pile

16 Gentle wind can carry sand grains for ..... distances.

a. short b. long c. huge d. very long

2 Put (✓) or (✗):

1 The Earth's surface changes from time to time. ( )

2 All changes to the Earth's surface take hundreds of years. ( )

3 Canyons take millions of years to be formed. ( )

4 The Earth's surface never changes. ( )

5 The deposition process takes place before the erosion process. ( )

6 We can see weathering in action everywhere around us. ( )

7 Plant roots help in the formation of rocks. ( )

8 Rocks become stronger when iron found in them rusts. ( )

9 Wind is one of the agents that cause weathering. ( )

10 Chemical weathering causes greater changes to rocks than mechanical weathering. ( )

11 Sometimes you can see erosion happening. ( )

12 The deposition process never changes the shape of the Earth's surface. ( )

13 The formation of sand dunes in the Eastern Desert in Egypt is due to the movement of the wind. ( )

14 Floods are one of the factors that cause water erosion. ( )

15 The erosion process is usually followed by the weathering process. ( )

3 Write the scientific term:

1. They are deep valleys carved by the flowing water. (.....)
2. It's the process of moving rocks from one place to another. (.....)
3. It's the process of laying sediments down. (.....)
4. It's the kind of weathering that changes the structure and color of rocks. (.....)
5. They are tiny, like plants, that live on rocks and produce acids on them. (.....)
6. It is the gas that causes the red-colored rust on some rocks. (.....)
7. It is a type of weathering that occurs in rocks and leads to the formation of a completely different material. (.....)
8. It is a type of weathering that breaks rocks down without changing their matter. (.....)
9. It is an eroding factor that pulls rocks down mountainsides. (.....)
10. It is an eroding factor that moves rocks from their banks downstream. (.....)
11. It is the process that lays sand down when the wind stops blowing. (.....)
12. It is a landform of deposited sediments formed when a river meets a sea. (.....)

4 Complete the following using the words between the brackets:

A (Mechanical - Acid rain - chemical - oxygen – Acids – iron – plant roots)

1. The melting and freezing cycles of water have the same effect as ....., as they make the cracks in the rocks wider.
2. ..... produced by lichens may dissolve rocks.
3. ..... has the same effect of lichens on rocks.
4. ..... weathering and ..... weathering are types of weathering.
5. When the ..... in air reacts with ..... in rocks, a red-colored rust is formed.

B (water - Nile Delta - hurricane - deposition - gentle wind - Egyptian Western Desert)

1. A ..... forms a small sand dune, while a ..... forms large sand dunes like that in the ..... .
2. ..... is a fan-shaped mass of mud and sediments.
3. Wind, ..., and gravity are natural factors that control erosion process.
4. The process of laying down sediment after its erosion is called ..... .

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Lichens	a. causes mechanical weathering of rocks.
2 Water	b. causes the red-colored rust on a toy car.
3 Oxygen	c. produce acids as they grow on rocks.
4 Melting and freezing	d. may cause both types of weathering.

1 ..... 2 ..... 3 ..... 4 .....

6 Study the following figures, then complete the following sentences:

Figure (1)

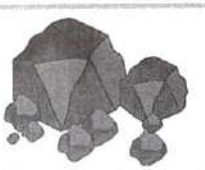


Figure (2)

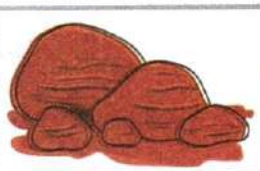


Figure (3)

Figure (4)

1. Figure (.....) represents a living organism that causes mechanical weathering.
2. Figure (.....) represents a living organism that causes chemical weathering.
3. Oxygen gas has a bad effect on rocks in figure (.....).

7 Give reasons for:

1. The Earth's surface is always changing.

.....

2. Oxygen in the atmosphere has a bad effect on some rocks.

.....

3. Lichens dissolve rocks as they grow.

.....

4. Chemical weathering causes greater changes to the rocks.

.....

5. Erosion and deposition are linked processes.

.....

8 What happens if?

1. Oxygen gas reacts with iron rocks, forming a red-colored rust?

.....

2. Acid rain falls on rocks?

.....

3. The lichens that grow on rocks produce acids?

.....

4. Plant roots grow inside rocks' cracks?

.....

Concept 2 Changing Landscapes

1 Summary of Concept 2

- Many factors can change the Earth's surface and form new landforms, such as:

Canyon

Sand Dune

Valley

Delta

1 Canyons:

They are special types of valleys carved by flowing water.

Processes	Weathering and erosion
Factors	Water, wind, and other factors
Age	Canyons take millions of years to be formed.
Properties	• The sides are steep. • Walls are narrow and vertical. • They usually consist of many layers.

How are canyons formed?

1. Gravity pulls rainwater downhill, forming small streams.
2. Small streams are joined together to form a bigger stream (river).
3. The water of the river moves fast and erodes rocks in its pathway.
4. When a river dries after a very long time, a canyon may be formed.

Factors affect the shape of the valley

1. The types of rocks
2. Speed of the river
3. Size of the river
4. Age of the river

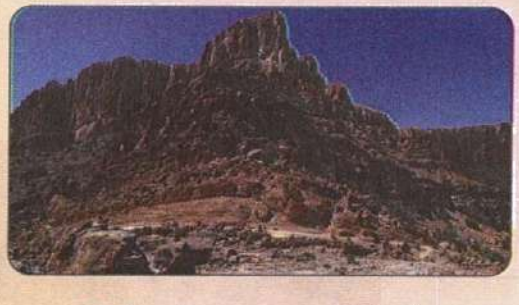
Examples of canyons and their properties

① The Grand Canyon

- The Grand Canyon is the largest canyon in the world.

Location	United States of America
Age	It is millions of years old.
Shape	• It is very large and steep. • It contains many layers of rocks. • There is a river at the bottom.

② Wadi Nakhr (Oman)

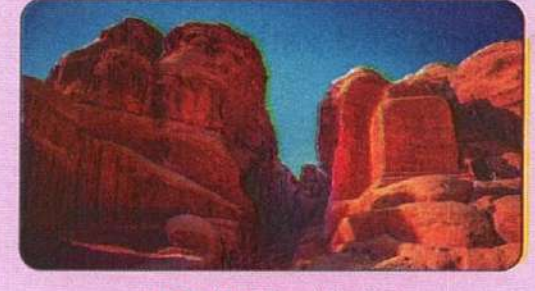


- Color: Brown and black

③ Small Canyons (Thiland)

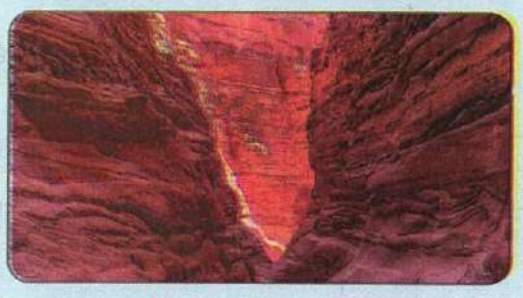
- Color: Reddish

④ Wadi Rum (Jordan)



- Color: Reddish
- V-Shaped

⑤ Colored Canyon (Sinai)

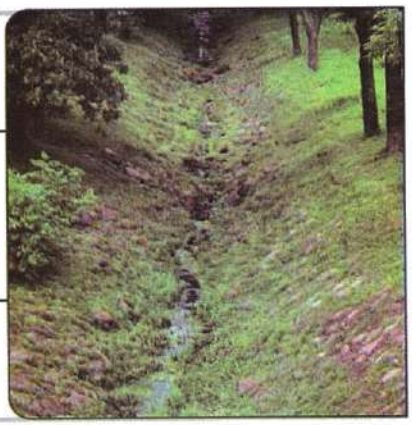


- Color: Reddish
- V-Shaped

- **When water is moving over the sand,**
  it pushes some of the sand away and leaves an impression.

- **Small canyon:**

How is it formed?	A stream of water may have formed it.
What is your evidence?	• There are trees and plants on both sides. • The sides are gently sloped
What happens if it rains a lot on it?	It will become deeper.



2 Valleys:

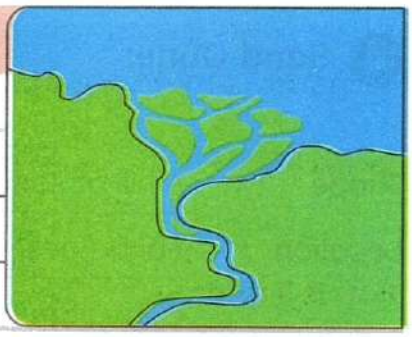
They are lowland areas between mountains.

Processes	**Weathering** and **erosion**
Factors	**Water**, **wind**, and **other factors**.
Properties	• The sides are **gently sloped**. • They are usually surrounded by a **wide**, **flat plain**.

Similarities between canyons and valleys

- They are formed by rivers or streams.
- They often have rivers or streams flow in the bottom.

3 Delta:



Process	Deposition
Factor	Water
Shape	Triangular (fan) shape

How is delta formed?

1. Fast-moving rivers carry sediments called **silt**

Silt is made up of very fine bits of **sand**, **clay** or **rock materials**

2. The water of the river is full of sediment that has been collected along the journey.

3. When the **rapid flowing water** "of the river" enters **still water** "lake", or **slower water** "ocean or sea", water loses energy and drops the sediment that it is carrying, forming a **delta**

- **The wetland of plants in the delta helps in increasing deposition**

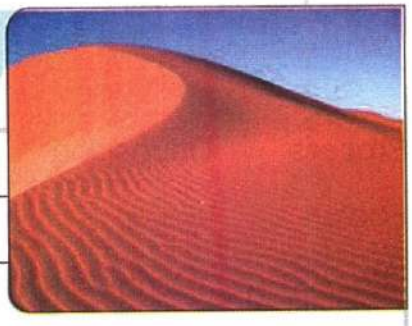
Because they are responsible for slowing down the water in the river.

The Nile River Delta

"The most famous delta in the world".

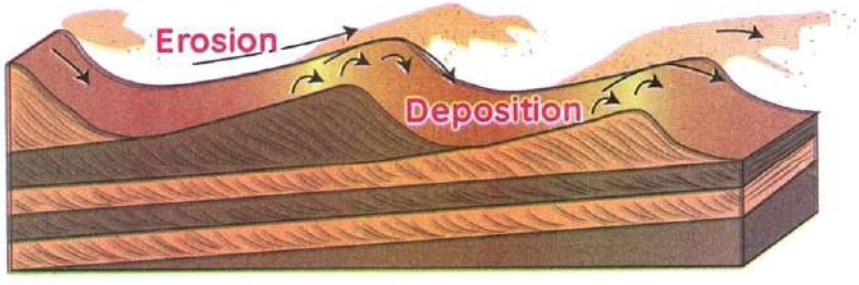
Area	It covers over **20,000 km²** in Egypt.
Location	Lies between Cairo and the Northern coast of Egypt.
Importance	It is characterized by the presence of **fertile soil** that allows the cultivation of different types of crops.

4 Sand Dune:



Shape	A hill of sand
Location	Sandy desert or sandy beach
Area	• They are found in groups. • They may cover a large area. (Hundreds of meters tall).
Processes	Erosion and deposition
Factors	Wind-blown sand
How they are formed?	Sand dunes are formed when a barrier like a rock blocks the wind-blown sand.

Sand Dunes Movements



- Dunes are interesting because they are constantly moving, as follows:

1. When wind blows across a dune,
   it erodes away the sand grains from the side it blows.
2. The grains of sand are carried up by the wind along the slope of the dune.
3. When they reach the top,
   the dune forms a barrier to the wind.
   So, the sand grains roll down the other side.

Wind Erosion

- The wind in the desert can be a powerful force of change.
- Wind and sand work together to erode rocks.
- The distance that the sand grains move depends on the force of the wind.

1. As the force of the wind becomes weaker, → the sand moves for a shorter distance.
2. As the force of the wind becomes stronger, → the sand moves for a longer distance.

- The way the sand moves depends on the direction of the wind.

Steps of Erosion by Wind

1. When wind blows across the land, it picks up sand and other rock particles and carries them along.
2. When this flying sediment hits a rock, it wears down that rock like a sandblaster.
3. This process carves the rock into strange shapes.

Recognizing signs of weathering, erosion, and deposition is very useful.

Because it helps us build houses in safe places, where:

1. People must not build a house on a hill that is eroding.
2. People must not build a house very close to a river.

2 Definitions of Concept 2

Valleys	They are lowland areas between mountains.
Canyons	They are special types of valleys with steep sides.
Delta	It is a landform formed by the deposition of sediments when a river meets a sea.
Sand Dune	It is a hill of sand created by the erosion and deposition of the wind-blown sand.
Slits	They are sediments that contain very fine bits of sand, clay, or rock materials.

3 Give Reasons for... Concept 2

1. You must avoid building a house on a hill and exposing it to erosion.
   - Because the river may change its path and cause erosion and deposition of the house.
2. There are similarities between valleys and canyons.
   - Because both of them were formed by flowing water.
   - Because they may have rivers or streams flowing through their bottoms.
3. A delta is formed when flowing water enters still water.
   - Due to the deposition process, as water loses energy and drops its sediments forming a delta.
4. The roots of plants increase the deposition of rivers' sediments.
   - Because the roots of plants slow down the water movement, which increases the rate of the deposition process.
5. Delta allows the cultivation of different types of crops.
   - Because it has fertile soil.
6. Sand dunes are constantly moving.
   - Due to the force of the wind.

4 What Happens if...? Concept 2

1. Streams of water flow over flat land?
   - They may form small canyons where they flow.
2. It rains a lot in a small canyon?
   - This small canyon will get deeper.
3. Small streams of water join together?
   - It will form a river, which causes more erosion.
4. The wind blows across a sand dune?
   - Sand grains are eroded away from the side of the wind coming from.
5. Wind-blown sand hits a big rock?
   - Sand is deposited, forming a sand dune.
6. The force of the wind carrying sand increases?
   - Wind will move sand grains for a longer distance.
7. The direction of the wind changes?
   - The way the sand moves changes.

5 Revision on Concept 2

1 Choose the correct answer:

1 A canyon may take ..... of years to be formed.
a. hundreds b. tens c. millions d. couple

2 Canyons can be formed in many ways, including ..... .
a. weathering only b. erosion only
c. weathering and erosion d. erosion and deposition

3 If the rain falls over a canyon several times per year, ...
a. its depth increases b. its depth decreases
c. it becomes flat d. not be affected

4 The shape of a rock gets worn and rounded by the effect of the ..... process.
a. weathering d. deposition c. erosion d. photosynthesis

5 ..... is/are evidence of deposition.
a. A rounded, worn rock b. A patch of sand on the ground
c. An area with canyons d. Red-colored rocks

6 A river may make a new ..... at its end through the ..... process.
a. mountain, deposition b. canyon, erosion
c. land, deposition d. land, weathering

7 ..... pulls rainwater downhill, forming small streams.
a. Magnetism b. Gravity c. Sunlight d. Wind

8 All the following factors affect the shape of the valley, except ..... .
a. the river's size b. the river's speed
c. the rocks' type d. the rocks' color

9 A ..... is a deep valley with high, steep sides.
a. hill b. mountain c. canyon d. dune

10 ..... are lowland areas with gently-sloped sides.
a. Valleys b. Deltas c. Canyons d. Dunes

11 When a river meets a sea or an ocean, a landform known as a ..... is formed.
a. canyon b. volcano c. mountain d. delta

12 All the following are created by the water of rivers or streams, except ..... .

b. deltas b. canyons c. valleys d. sand dunes

13 Silt carried by water contains all the following, except ..... .

a. sand b. clay c. rocks d. glass

14 A sand dune is formed by the ..... process, then the ..... process.

a. deposition, erosion b. erosion, weathering

c. erosion, deposition d. deposition, weathering

15 Which of the following factors helps in the formation of sand dunes?

a. Water b. Wind c. Light d. Heat

16 When a rock blocks the path of flying sand, a ..... may be formed.

a. dune b. river c. canyon d. delta

2 Put (✓) or (✗):

1 Wadi Rum in Jordan is an example of a sand dune. ( )

2 All canyons have the same shape, texture, and color. ( )

3 The sides of the canyon at the beginning of its formation are gently-sloped. ( )

4 Understanding the formation of landforms helps us predict future changes of landforms. ( )

5 It is better to build your house on a hill that is eroding. ( )

6 A river never changes its path, so it's safe to build a house near any river. ( )

7 When a river moves down a steep slope, its speed decreases. ( )

8 Most valleys are formed due to the erosion of many sediments and their transfer far away. ( )

9 The shape of the valley depends on the type of its rocks. ( )

10 A slow-moving river has a lot of energy, so it causes more erosion. ( )

11 A delta is formed when the speed of the river water increases. ( )

12 Silt carried by a river contains large bits of sand and clay. ( )

13 Sand dunes are formed when a rock blocks water-blown sand. ( )

14 Sand dunes are formed by the deposition process only. ( )

15 The formation of sand dunes in the Eastern Desert in Egypt is due to the movement of wind. ( )

16 Dunes are formed at the bottom of seas. ( )

3 Write the scientific term:

1 It's a deep valley that formed due to the weathering and erosion of wind and water. (.....)

2 It's a force that pulls rainwater downhill, forming small streams. (.....)

3 It's the world's largest canyon, located in the USA. (.....)

4 They are often found at the bottom of both canyons and valleys. (.....)

5 It's a sediment carried by a river that contains sand, clay, and rock materials. (.....)

6 It's a fan-shaped land that is formed when a river meets a sea. (.....)

7 It's a process that causes the carving of rocks into different shapes by wind-blown sand. (.....)

4 Complete the following using the words between the brackets:

A (small canyon - impression - V-shaped - water stream - brown and black-colored)

1 When the rain falls on a flat sandy land, it will leave an ..... .

2 Wadi Nakhr is a ..... canyon.

3 Wadi Rum and colored canyon in Sinai are ..... canyons.

4 In the beginning of a ..... formation, plants and trees grow at the two sides of it due to the effect of the ..... .

B (less - high - more - gravity - increases - sediments - many layers)

1 Rainwater is pulled downhill, forming a small stream due to ..... .

2 When the water of a river moves downhill on a steep slope, the water speed ....., which causes ..... erosion.

3 A small stream causes ..... erosion than a large river.

4 The force of rushing water erodes a lot of ..... of a mountain and carries them away.

5 Walls of canyons are very ..... and are composed of many ..... .

C (deposition – canyon – fan – decreases – increases – delta)

1. A ..... is formed by the erosion process, while a ..... is formed by the deposition process.
2. The Nile River Delta has a ..... shape.
3. When the stream water speed ....., it causes ..... of sediments.
4. When the force of blowing wind ....., the blown sand is carried for a longer distance.

5 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Wadi Nakhr	a. is a black and brown canyon in Oman.
2 Wadi Rum	b. is a V-shaped canyon in Jordan.
3 Small canyon	c. is a reddish canyon in Thailand.

1 ..... 2 ..... 3 .....

B

Column (A)	Column (B)
1 Erosion	a. is the fine particles of clay, sand, and rock materials.
2 Deposition	b. occurs when a stream water rushes quickly downhill a mountain.
3 Sand dunes	c. are hills of sand usually seen in groups and they may cover large areas.
4 Silt	d. occurs when a stream water speed slows down at the end of a river.

1 ..... 2 ..... 3 ..... 4 .....

6 Cross out the odd word:

Mountain - Valley - Gravity - Canyon (.....)

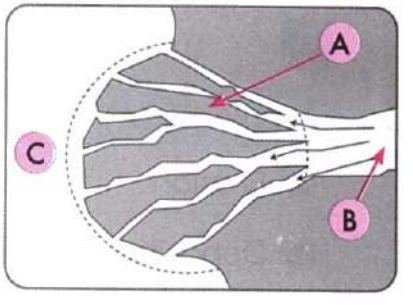
7 Study the following figures, then put (✓) or (✗):

Figure (A)

Figure (B)

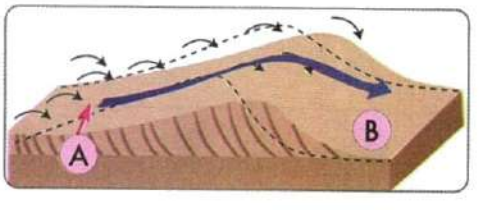
1. The landform in figure (A) has gently-sloped sides. ( )
2. The landform in figure (B) may be surrounded by some plains between mountains. ( )
3. Both landforms are formed due to erosion carried by rivers. ( )
4. The walls of the landform in figure (A) are higher than those in figure (B). ( )

8 Study the following figure, then choose the correct answer:



1. The area (A) would become a ..... (delta - canyon) due to the ..... (erosion - deposition) process.
2. The ..... (area "C" - area "B") could be a sea or a lake.
3. The ..... (area "C" - area "B") is a river.

9 Study the following figure, then complete:



1. The erosion of sand occurs in area ..... .
2. The deposition of wind-blown sand occurs in area ..... .

10 Give reasons for:

1. It is not safe to build a house close to a river.

.....

2. Valleys and canyons are formed in the same way.

.....

3. Sand dunes are formed in a desert.

.....

11 What happens if?

1. A water stream flows over a flat land?

.....

2. A lot of rain falls on a small canyon?

.....

3. Small streams of water are joined together? (concerning erosion)

.....

4. A river carrying sediments meets a sea?

.....

5. Wind-blown sand grains hit a big rock in the desert?

.....

PROJECTS

Project 1 Unit 3

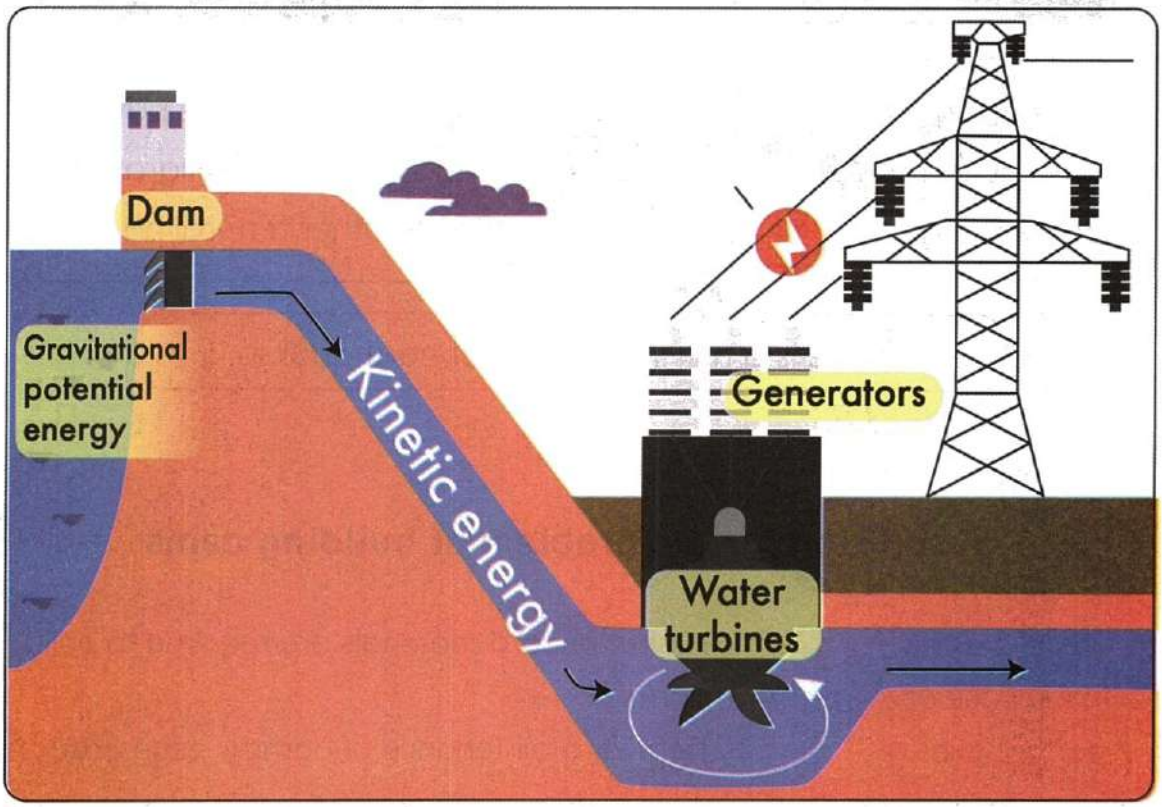
Dam Impacts

Solve Problems Like a Scientist

- We have learned that humans use the kinetic energy of water to generate hydroelectricity by building dams on rivers to control water and increase the energy of water.
- A dam is a structure that is built on rivers for conserving water.

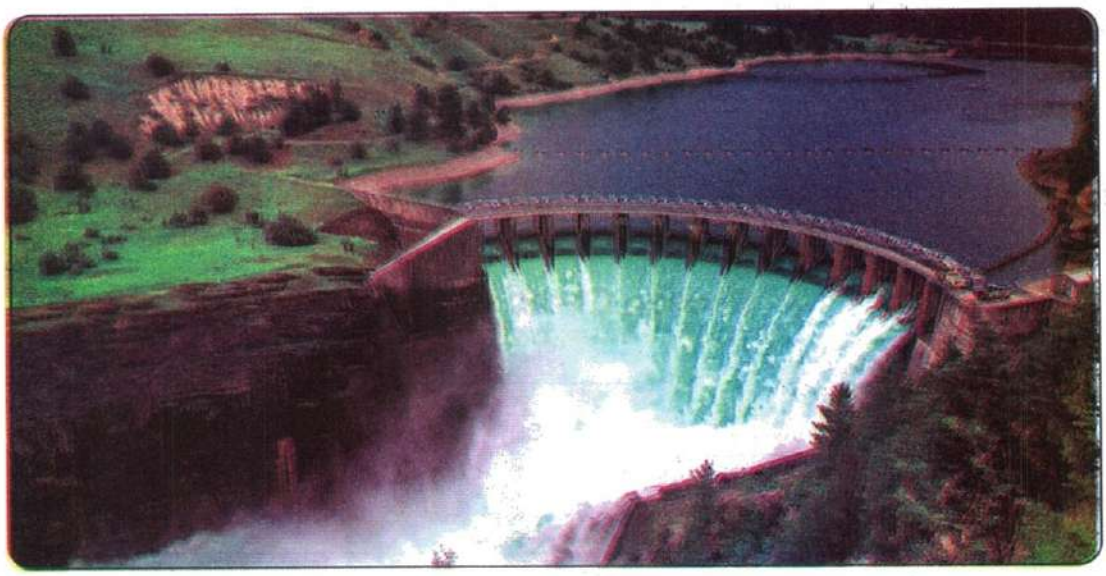
Energy Chain of a Dam

Potential energy (of water behind dam) → is converted into → kinetic energy (to move water turbines) → is converted into → electrical energy (travels through wires)



Advantages of Dams

1. They are used to generate hydroelectric energy.
2. They control the flow of water to rotate wind turbines.
3. They provide a steady water supply.



Disadvantages of Dams

1. The cost of construction of dams is high.
2. The change in the path of rivers affects the migration of fish or other natural habitats.
3. There is a risk in the case of earthquakes.

A solution for the problem of building dams

There is a risk in the case of earthquakes. →

1. High-standard materials are required to build dams.
2. Regular maintenance of dams is necessary.

Interdisciplinary Project

Sunny Side up

- The project "Sunny Side up" helps you think about the impact of deforestation and how humans can use solar energy as a clean source of energy.

- يساعدك مشروع الجانب المشرق على التفكير فى تأثير إزالة الغابات، وكيف يمكن للإنسان استخدام الطاقة الشمسية كمصدر نظيف للطاقة.

Deforestation

- Cutting down trees to get wood for cooking may lead to **deforestation** that has negative impacts, such as the death of some **animals** or **plants**
- Deforestation can be stopped by using **solar energy** instead of wood from trees as a source of energy for cooking food.
- Some difficulties humans may face when using solar energy including the fact that the materials used to collect solar energy are very expensive.

- قطع الأشجار من أجل الحصول على الوقود الخشبي من أجل الطهي قد يؤدي لإزالة الغابات التي قد يكون لها آثار سلبية مثل موت بعض الحيوانات أو النباتات.
- يمكن وقف إزالة الغابات باستخدام الطاقة الشمسية بدلًا من خشب الأشجار كمصدر للطاقة لطهي الطعام.
- قد يواجه الإنسان بعض الصعوبات عند استخدام الطاقة الشمسية؛ بسبب أن المواد المستخدمة لتجميع الطاقة الشمسية باهظة الثمن.

Solar Cooker

A device that converts solar energy into thermal energy is used in cooking food.

هو جهاز يُحوِّل الطاقة الشمسية إلى طاقة حرارية تُستخدم في طهي الطعام.

Structure:

- It contains metal plates placed in a certain way to collect the largest amount of solar energy and focus it in one area.
- It also contains materials that keep the generated thermal energy inside the solar cooker for a period of time enough to cook food inside.

- يحتوي الموقد الشمسي على ألواح معدنية مُوجَّهة بطريقة معينة؛ لتجميع أكبر قدر من الطاقة الشمسية وتركيزها في منطقة واحدة.
- يحتوي أيضًا على مواد تحافظ على الطاقة الحرارية المتولدة داخل الموقد الشمسي لفترة من الوقت تكفي لطهي الطعام بداخله.

Project 2 Unit 4

Forces That Shape the Earth

Solve Problems Like a Scientist

- In this project, you will use what you know about how the surface of the Earth changes to model how different environmental factors have affected the landscape of Wadi Nakhr over time.
- Wadi Nakhr's landscape has been shaped by the weathering forces of running water, wind, and erosion. You can also find evidence of volcanic activity that occurred millions of years ago.

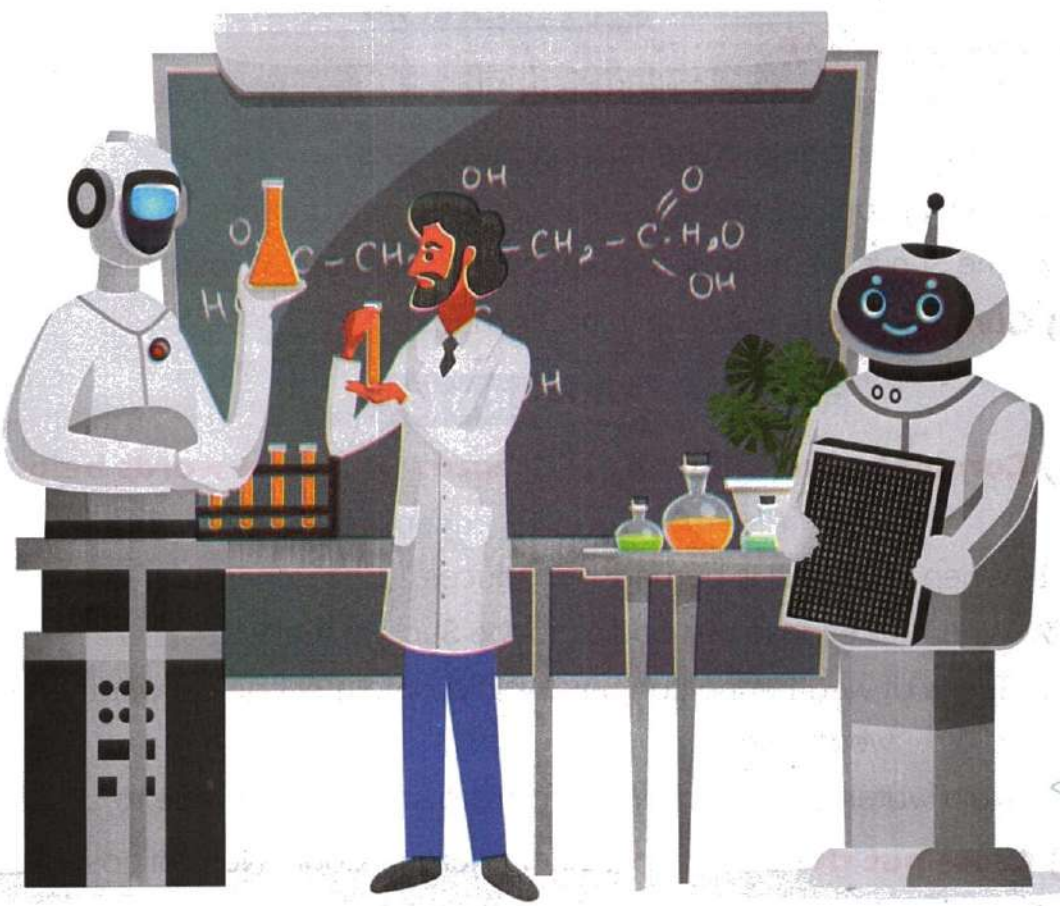
- سنقوم في هذا المشروع بتصميم نموذج يُوضِّح أثر العوامل البيئية على مظاهر السطح في وادي نخر بمرور الزمن.
- لقد تشكَّلت مظاهر سطح وادي نخر بفعل التجوية التي سببتها المياه والرياح وعوامل التعرية، وقد تجد أدلة على حدوث نشاط بركاني منذ ملايين السنين.

Look at the images of landforms in Wadi Nakhr.
Then think about how different environmental factors can affect landscapes.
Then predict which factors affected the formation of each landform.

• لاحظ الصور التالية لمظاهر سطح مختلفة فى وادي نخر، فكّر في العوامل البيئية المختلفة التي تؤثر على مظاهر السطح، توقّع العوامل المؤثرة على التضاريس الآتية:

Image	Which factors affected the formation of this landform?	(Reasons) Explain Your Thinking
Large chunks of basalt	• Weathering by the forces of wind and water. • عوامل التجوية التي سببتها الرياح والماء.	• Running water and wind carrying sand carve and break down rocks. • تتسبب المياه الجارية والرياح المحملة بالرمال في نحت وتفتيت الصخور.
Smooth and steep sides		
Deep canyon, layers of rocks		
Folded and rippling mountainsides		

Government Model Exams



1 Cairo Governorate – Exam 1

Question (1)

(A) Choose the correct answer:

1. The forms of fuel present in car fuel stations are ..... .
   a. gasoline and wood b. natural gas and coal
   c. wood and coal d. natural gas and gasoline
2. Curiosity Rover is designed to explore ..... .
   a. Earth b. Mars c. the Sun d. the moon
3. Sand is formed by the breaking down of ..... .
   a. glass b. wood c. rocks d. plastic
4. All the following processes change the Earth's surface, except ..... .
   a. weathering b. erosion c. digestion d. deposition

(B) What happens to a flat land if a water stream flows over it?

Question (2)

(A) Put (✓) or (✗):

1. Both canyons and valleys often have rivers at their bottom. ( )
2. Plants roots help in the formation of rocks. ( )
3. Energy can't be changed from one form to another. ( )
4. The Sun is the main source of forming biofuel and fossil fuel. ( )

(B) Give a reason for: Iron in rocks may rust.

Question (3)

(A) Complete the following sentences using the words below:

(thermal – gravity – chemical – warm)

1. When fossil fuel is burned, it produces ..... energy.
2. When we expose our bodies to the Sun, we feel ..... .
3. Types of weathering can be classified into mechanical weathering and ..... weathering
4. Rain water is pulled downhill forming small stream due to ..... .

(B) Cross out the odd word: Solar energy - Coal - Natural gas - Gasoline

2 Cairo Governorate – Exam 2

Question (1)

(A) Choose the correct answer:

1. Limestone caves are formed due to the combination of ..... .
   a. dissolved minerals b. red-colored rusts
   c. living organisms d. acid rains
2. A canyon may take ..... of years to be formed.
   a. hundreds b. tens c. millions d. a couple
3. Inside the electric power stations, the heating of ..... produces steam.
   a. turbines b. generators c. water d. fuel
4. The energy source in a toy car is the ..... .
   a. engine b. tires c. battery d. fuel

(B) What happens if: A river carrying sediments meets a sea?

Question (2)

(A) Put (✓) or (✗):

1. Global warming is caused by the increase of the oxygen percentage in the atmosphere. ( )
2. Deposition process never changes the shape of the land. ( )
3. We have to conserve all forms of fuel. ( )
4. Electricity generated by wind turbines is transmitted through the wind. ( )

(B) Give a reason for: Farmers must reduce the usage of pesticides.

Question (3)

(A) Complete the following sentences using the words below:

(natural gas – sand dune – weathering – valley)

1. A ..... is formed when blowing-wind sand hits a rock.
2. The ..... is the process in which rocks are broken down to form sediments.
3. Some forms of fuel can be used in cooking food, such as wood and ..... .
4. A ..... is a gently-sloped landform found between mountains.

(B) Cross out the odd word:

Solar energy - Wind energy - Natural gas - Water (.....)

3 Cairo Governorate - Zeitoun Zone

Question (1)

(A) Choose the correct answer:

1. The main source of most of energy on Earth is the ..... .
   a. electricity b. Sun c. moon d. wind
2. ..... is the process in which sediments are moved to another place on the Earth's surface.
   a. Erosion b. Weathering c. Deposition d. Melting
3. Nonrenewable resources of energy include ..... .
   a. wood b. gasoline c. grass d. water
4. Which of the following factors helps in the formation of sand dunes?
   a. Water b. Wind c. Light d. Heat

(B) What are the types of weathering?

Question (2)

(A) Put (✓) or (✗):

1. Using fossil fuel protects the environment from pollution. ( )
2. Mechanical weathering causes a change in the structure of the rocks and a new substance is formed. ( )
3. The shape of the valley depends on the types of rocks. ( )
4. The electrical energy that is generated from water is called hydroelectric energy. ( )

(B) What are the factors that cause erosion?

Question (3)

(A) Write the scientific term:

1. It's a deep valley with steep sides. (.....)
2. It is formed from the remains of plants and animals buried for long periods of time. (.....)
3. Energy can neither be created nor destroyed; it can only be converted from one form to another. (.....)
4. They are built on rivers to control the water flow and increase the potential energy of water. (.....)

(B) Give an example of: A landform that is formed by deposition process.

4 Cairo Governorate - Al-Azhar Al-Sharif

Question (1)

Choose the correct answer:

1. ..... is a renewable resource of energy.
   a. Coal b. Natural gas c. Water d. Fossil fuel
2. The input energy used to control the Mars exploration vehicle is ..... .
   a. electrical energy b. light energy
   c. kinetic energy d. mechanical energy
3. Which of the following is an evidence of erosion?
   a. Sand dunes formation b. Forming rocks crumbs
   c. Nile River delta formation d. Breaking of a rock

Question (2)

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The Law of Conservation of Energy:	a. is among nonrenewable energy resources.
2 The Sun	b. Energy isn't destroyed, but it can only be converted from one form to another.
3 Wind turbines	c. convert wind energy into electrical energy.
	d. is the main source of energy on Earth.
	e. Energy is destroyed and cannot be transformed from one form to another.

Question (3)

Put (✓) or (✗):

1. Most valleys are formed due to the erosion of many sediments and their transfer far away. ( )
2. The formation of sand dunes in Eastern Desert in Egypt is due to the movement of the wind. ( )
3. The energy produced from the flowing water of waterfalls and dam turbines is called chemical energy. ( )

Question (4)

Write the scientific term:

1. It's a type of fuel made from living organisms that can be planted.
2. It's the energy produced by the blender that helps it do its job.
3. It's the process in which rocks are broken into smaller particles.

Question (5)

Complete the following sentences using the words below:

(wood - water - electrical - light - coal - natural gas)

1. Ancient people used ..... as a fuel before discovering gasoline.
2. ..... is a renewable resource of energy.
3. The energy that is produced from solar panels is ..... energy.

5 Giza Governorate – Exam 1

Question (1)

(A) Choose the correct answer:

1. In the washing machine, ... energy is converted into kinetic energy.
   a. light b. thermal c. electrical d. potential
2. All the following are forms of fossil fuel, except ..... .
   a. wind b. coal c. natural gas d. oil
3. Sand is formed due to the breaking down of ..... .
   a. glass b. rocks c. plastic d. wood
4. The breaking down of large rocks into small particles represents the ..... process.
   a. weathering b. photosynthesis c. erosion d. deposition

(B) Give a reason for: The iron in rocks may rust.

Because iron reacts with ..... gas.

Question (2)

(A) Put (✓) or (✗):

1. Water causes both mechanical and chemical weathering. ( )
2. A canyon is a type of valleys. ( )
3. Oil and coal are considered nonrenewable energy resources. ( )
4. Dams are built on rivers to control the wind flow. ( )

(B) What happens if:

A river carrying sediments meets the sea?

Question (3)

(A) Complete the following sentences using the words below:

(Sun – water – sound – biofuel)

1. Wind, ... and gravity are natural factors that control the erosion process.
2. Wood and charcoal are examples of ..... .
3. Most of energy chains start with the ..... .
4. The output energy of the hand bell is ..... energy.

(B) Cross out the odd word:

Plant roots – Wind – Acid rain – Temperature (.....)

6 Giza Governorate – Exam 2

Question (1)

(A) Put (✓) or (✗):

1. Energy cannot be transformed from one form to another. ( )
2. A hand bell converts kinetic energy to sound energy. ( )
3. The Earth's surface changes from time to time. ( )
4. When the iron in rocks rusts, the rocks become stronger. ( )

(B) Give a reason for: Sand dunes are formed.

Sand dunes are formed due to the effect of ..... .

Question (2)

(A) Choose the correct answer:

1. Both the hair dryer and the electric water kettle produce ..... energy.
   a. chemical b. thermal c. light d. potential
2. All the following are renewable energy resources, except ..... .
   a. natural gas b. water c. the Sun d. wind
3. ..... are deep valleys carved by the flowing water.
   a. Mountains b. Hills c. Canyons d. Deltas
4. Moving the sediments from a place to another represents the ..... process.
   a. weathering b. photosynthesis c. erosion d. deposition

(B) Complete: A ..... is a triangle-shaped mass of mud and sediments that forms when a river enters a large body of water.

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Wood	a. is a fossil fuel.
2 Coal	b. is one of the mechanical weathering factors.
3 Acid rain	c. is a biofuel.
4 Temperature	d. is one of the chemical weathering factors.

(B) What happens if: The lichens growing on rocks produce acids?

The rocks will be ..... .

7 Giza Governorate – Exam 3

Question (1)

Write the scientific term:

1. It's the form of energy that is stored in the battery of a remote control. (.....)
2. It is a phenomenon in which the Earth's temperature increases when carbon dioxide gas increases in the air. (.....)
3. It's energy that is generated from windmills and transmitted through wires to houses and factories. (.....)
4. They're hills of sand in deserts that are formed by erosion and deposition. (.....)
5. They're tiny plant-like organisms that produce acid on rocks, making them break down. (.....)

Question (2)

Put (✓) or (✗):

1. Energy cannot be transformed from one form to another. ( )
2. Most energy chains start with the moon. ( )
3. When pedalling a bike, the chemical energy in your body changes to kinetic energy. ( )
4. There is a stored chemical energy inside the food we eat. ( )
5. Biofuel is a nonrenewable resource of energy. ( )

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Solar panels	a. are used in cooking food.
2 Curved mirrors	b. were used to grind grains.
3 Windmills	c. are used to generate electricity.

(B) From the opposite figures:

1. What is the name of this device? .....
2. It changes ..... energy to ..... energy.

8 Qalyubiyya Governorate

Question (1)

(A) Choose the correct answer:

1 ..... is the main source of energy on the Earth's surface.
a. Oil **b.** Gasoline **c.** Natural gas **d.** The Sun

2 In water turbines, the ..... energy of the water is changed into electrical energy.
a. sound **b.** kinetic **c.** thermal **d.** potential

3 ..... is a renewable source of energy.
a. Oil **b.** Wind **c.** Coal **d.** Natural gas

4 ..... may cause chemical weathering or mechanical weathering.
a. Oxygen **b.** Water **c.** Rocks **d.** Lichens

(B) Cross out the odd word:

Weathering – Photosynthesis – Deposition – Erosion (.....)

Question (2)

(A) Put (✓) or (✗):

1 Canyons may take millions of years to be formed. ( )
2 Most of energy chains start with the moon. ( )
3 Charcoal is formed from the decomposition of the remains of ancient plants. ( )
4 Biofuel is a nonrenewable resource of energy. ( )

(B) Write the scientific term:

It's a kind of weathering that changes the structure and color of rocks.

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 A greenhouse	**a.** are used to generate electricity from solar energy.
2 A valley	**b.** usually has a triangular shape.
3 A delta	**c.** has gently-sloped sides.
4 Solar panels	**d.** helps to grow crops that only grow in warm climates.

(B) Give an example of: A fossil fuel.

9 Alexandria Governorate – Exam 1

Question (1)

(A) Choose the correct answer:

1. Energy isn't destroyed nor created from nothing. This indicates ..... .
   a. the drawing of energy resources
   b. the conservation and transformation of energy
   c. that the resources of energy are numerous
   d. the destruction of energy resources
2. ..... is a resource that we consume at a faster rate than its formation in nature.
   a. Wind b. Water c. Solar energy d. Fossil fuel
3. Dissolving minerals from rocks and recombining them with new substances is an example of ..... .
   a. mechanical weathering b. weathering by wind
   c. deposition in rivers d. chemical weathering
4. The steep valleys that are formed due to the flowing water erosion are called ..... .
   a. canyons b. sand dunes c. hills d. delta

(B) Give a reason for:

The roots of trees can be an agent for shaping the Earth's surface.

Question (2)

(A) Complete the following sentences:

1. The output energy of the hair dryer that helps it do its function is ..... energy.
2. In large cities, pollution with ..... causes irritation in the eyes and lungs.
3. Types of weathering are ..... weathering and chemical weathering.
4. After rocks weathering, the process of ..... occurs and the sand and soil move to another place.

(B) What happens if:

Oxygen gas reacts with iron rocks forming red-colored rust?

Question (3)

(A) Put (✓) or (✗):

1. Both a canyon and a valley often have rivers or steams that flow through their lowest point. ( )
2. All the changes to Earth's surface take hundreds of years. ( )
3. Wind and solar energy are nonrenewable energy resources. ( )
4. Mars Rover robot uses the same energy used in a remote-controlled toy car. ( )

(B) Write the scientific term: Gasoline - Coal - Natural gas (.....)

10 Alexandria Governorate – Exam 2

Question (1)

(A) Complete the following sentences using the words below:

(copper - Sun - electric lamp - charcoal)

1. Wood and ..... are examples of biofuel.
2. Most of energy chains start with the ..... .
3. The device used to convert electrical energy into light energy is the ..... .
4. Electric wires are made of ..... .

(B) Put (✓) or (✗): The burning of gasoline produces heat energy. ( )

Question (2)

(A) Choose the correct answer:

1. All the following are processes that can change the Earth's surface, except for ..... .
   a. digestion b. erosion c. weathering d. deposition
2. ..... and ..... cause mechanical weathering.
   a. Plant's roots, acid rain b. Lichens, water
   c. Oxygen, water d. Water, plant's roots
3. Oil is a nonrenewable energy resource that is used inside the ..... .
   a. flashlight b. car engine
   c. electric fan d. washing machine
4. Curiosity Rover is used to explore ..... .
   a. Earth b. Mars c. the Sun d. the moon

(B) Write the scientific term:

It's the energy produced from playing the guitar. (.....)

Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Water	a. is formed from the remains of dead plants.
2 Wind energy	b. is the main source of energy on Earth.
3 Coal	c. is a liquid renewable resource of energy.
4 The Sun	d. is used to generate electricity through wind turbines.

(B) Give a reason for: The iron in rocks may rust.

11 Alexandria Governorate – Exam 3

Question (1)

(A) Choose the correct answer:

1. When you use the hand bell, ... energy changes into sound energy.
   a. light b. thermal c. kinetic
2. When a rock blocks the path of flying sand, a ..... may be formed.
   a. dune b. river c. canyon
3. ..... is a renewable resource of energy
   a. Coal b. Natural gas c. Water
4. A canyon may take ..... of years to be formed.
   a. tens b. hundreds c. thousands

(B) Give a reason for:

We must turn off the lights that we don't need for a while.

Question (2)

(A) Cross out the odd word:

1. Erosion - Weathering - Digestion - Deposition (.....)
2. Wood - Natural gas - Gasoline - Glass (.....)
3. Acid rain - Wind - Plant root - Temperature (.....)
4. Fossil fuel - Waterfalls - Wind - Sunlight (.....)

(B) What happens if:

The lichens growing on rocks produce acids?

Question (3)

(A) Put (✓) or (✗):

1. Both canyons and valleys often have rivers in their bottom. ( )
2. Solar cells are composed of many solar panels. ( )
3. Mars is located a few meters away from Earth. ( )
4. There is a stored chemical energy inside the food we eat. ( )

(B) Write the scientific term:

It's any substance that produces thermal energy when it is burned. (.....)

12 Dakahlia Governorate

Question (1)

(A) Complete the following sentences:

1. Light energy is converted into ..... energy, which is stored in the form of sugar inside the trees.
2. ..... is used as a source of thermal energy in homes and cars.
3. ..... are deep valleys carved by the flowing water.
4. ..... is the process of laying down sediments after their erosion.

(B) What happens if: Acidic rain falls on rocks?

Question (2)

(A) Put (✓) or (✗):

1. Using solar energy is a way to conserve fossil fuel. ( )
2. Water is a nonrenewable resource that is used to generate hydroelectric energy. ( )
3. Acid rain is formed when carbon dioxide dissolves in the water found in the air. ( )
4. Deforestation is caused by the overuse of fossil fuel. ( )

(B) What is the role of wind in mechanical weathering?

Question (3)

(A) 1- Write the scientific term:

1. Energy is neither created nor destroyed; it can only be converted from one form to another. (.....)
2. It's a gas in the air that combines with the iron in some rocks and causes its weakness. (.....)

2- Complete the following table:

Device	Input Energy	Output Energy
1 Electric heater	.....	.....
2 Battery in your toy	.....	.....

(B) Give a reason for: Dams are built on rivers.

13 Suez Governorate

Question (1)

(A) Choose the correct answer:

1. Curiosity Rover is designed to explore ..... .
   a. Earth b. Mars c. the Sun d. the moon
2. Which form of energy is not used or produced when you turn on an electric bulb?
   a. Light energy b. Heat energy c. Electrical energy d. Sound energy
3. The formation of canyons takes ..... .
   a. a few minutes b. a few hours c. a few days d. many years
4. Gentle wind can carry sand grains for ..... distances
   a. short b. long c. huge d. large

(B) Give a reason for: Iron in rocks may rust.

Question (2)

(A) Put (✓) or (✗):

1. Wind can be considered one of the factors that cause weathering. ( )
2. The Earth's surface never changes. ( )
3. In a modern wind turbine, kinetic energy is converted into chemical energy. ( )
4. The Sun is the main source of energy on Earth. ( )

(B) Cross out the odd word: Gasoline - Charcoal - Coal - Natural gas

Question (3)

(A) Complete the following sentences using the words below:

(gently - renewable - Oil - deposition)

1. The sides of the canyon at the beginning of its formation are ..... sloped.
2. ..... is a nonrenewable source of energy.
3. Using the ..... resources of energy costs more money.
4. The process of laying down sediment after their erosion is called ..... .

(B) What happens if: A river that carries sediments meets the sea?

14 Port Said Governorate

Question (1)

(A) Choose the correct answer:

1. Fossil fuel needs ..... to be formed under the Earth's surface.
   a. five years b. ten years c. hundreds of years d. millions of years
2. Water flows through the turbines in the dams to generate ..... energy.
   a. electrical b. potential c. solar d. light
3. When a river meets a sea or an ocean, a landform known as a ..... is formed.
   a. canyon b. volcano c. mountain d. delta
4. If the rain falls over a canyon for several times per year, ...
   a. its depth increases b. its depth decreases
   c. it becomes flat d. it won't be affected

(B) Write the scientific term:

It's a process in which rocks are broken down into smaller particles. (.....)

Question (2)

(A) Put (✓) or (✗):

1. Most energy chains start with the moon. ( )
2. You need gasoline to move a bicycle. ( )
3. Deposition process never changes the shape of the land. ( )
4. Wind can pick up sand grains and form sand dunes. ( )

(B) Give a reason for: Iron inside rocks may rust.

Question (3)

(A) Correct the underlined word:

1. Curiosity is a robotic vehicle that is designed to explore the surface of the moon.
2. Hydroelectric energy is a nonrenewable energy resource.
3. The origin of sand is the breaking down of some types of glass.
4. When the water of a river travels downhill on a steep slope, its speed decreases.

(B) What happens if:

A river erodes the sediments of a mountain over a long period of time?

15 Behira Governorate

Question (1)

(A) Choose the correct answer:

1. The stored energy inside the battery of a mobile phone is ..... energy.
   a. electrical b. light c. chemical
2. Fossil fuel is considered a ..... resource of energy.
   a. renewable b. nonrenewable c. permanent
3. ..... is the breaking down of rocks into small particles by physical factors.
   a. Mechanical weathering b. Chemical weathering c. Erosion
4. The process in which small particles of sand, soil and rocks are moved from a place to another is ..... .
   a. weathering b. erosion c. deposition

(B) Write the scientific term:

Energy is neither created nor destroyed. (.....)

Question (2)

(A) Put (✓) or (✗):

1. A spacecraft takes about 6 seconds to go to Mars. ( )
2. Most of the energy we use is produced from the Sun. ( )
3. Some types of plants can be used to make a liquid fuel. ( )
4. The roots of trees can make rocks break down. ( )

(B) What are the effects of the smog from cars on humans' health?

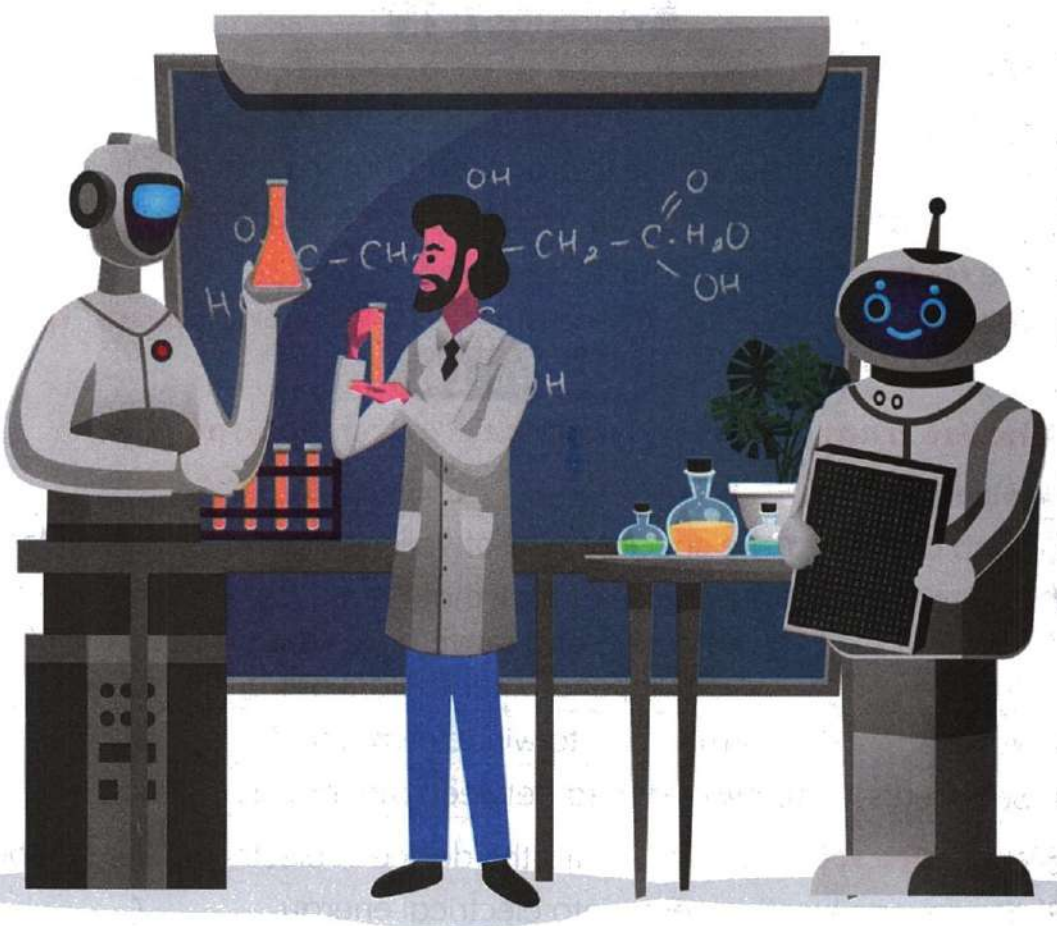
Question (3)

(A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Sand dunes	a. are special types of valleys that have steep sides.
2 Canyons	b. are pieces of rock that break down due to weathering and move from their place by the effects of gravity and other factors of transportation.
3 Valleys	c. formed due to windblown- sand.
4 Sediments	d. lowland area between mountains.

(B) Write the scientific term: It's the device in electric power stations that converts kinetic energy into electrical energy. (.....)

MODEL ANSWERS



Unit 3

Concept 1

Lesson 1

1 1 a 2 b 3 d 4 a
5 b 6 b 7 c 8 c
9 c 10 d 11 c

2 1 ✗ 2 ✓ 3 ✗ 4 ✗
5 ✓ 6 ✗ 7 ✗ 8 ✗

3 1 Curiosity Rover
2 Chemical energy
3 Solar panels
4 Solar energy or light energy

4 1 chemical – electrical
2 replace 3 sensors
4 sound – kinetic

5 (A) 1 c 2 d 3 b
(B) 1 a 2 c 3 b

6 1 (2) 2 (1) 3 3
4 (2) , (3)

7 1 To be operated and controlled.
2 To be operated so it can move and explore Mars.
3 Because robots on Mars are too far from local stores or sockets (plugs) on Earth to be replaced or recharged.

8 1 The drone cannot be operated.
2 The Mars rover cannot be operated and can't explore Mars.

Lesson 2

1 1 b 2 c 3 d 4 b
5 d 6 b 7 c 8 b
9 d 10 c

2 1 ✗ 2 ✓ 3 ✓ 4 ✗
5 ✓ 6 ✓ 7 ✓ 8 ✗
9 ✓

3 1 The Sun
2 Thermal energy
3 Chemical energy
4 Chemical energy
5 The spring 6 Energy chain

4 1 thermal energy (heat)
2 sound – kinetic 3 Coal
4 chemical - kinetic

5 1 d 2 c 3 a 4 b

6 a 4 b 2 c 1 d 6
e 3 f 5

7 1 Kinetic 2 (1)
3 (1)-(3) 4 (3) 5 (2)

8 1 Light 2 chemical
3 chemical – kinetic

9 1 Because all energy chains start with the Sun.
2 Because some of the energy escapes in other forms that the device doesn't use.
3 Because the chemical energy inside the wood changes into thermal energy.
4 Because the chemical energy inside your body changes into kinetic energy.

Lesson 3

1 1 b 2 b 3 d 4 d
5 b 6 a 7 b 8 a
9 c 10 b 11 b

2 1 ✓ 2 ✓ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✓ 8 ✓
9 ✓ 10 ✗ 11 ✗ 12 ✗
13 ✓ 14 ✓

3 1 Electric lamp
2 Thermal energy
3 Kinetic energy 4 Sound energy
5 Thermal energy
6 Thermal energy
7 Chemical energy
8 Electric energy 9 Light energy
10 The Sun 11 Copper
12 Law of conservation of energy
13 Light energy

4 1 electric
2 electric- output 3 electric
4 sound – kinetic

5 1 light – sound
2 chemical – kinetic
3 input – output

6 1 Lamp 2 Radio
3 Light bulb

7 1 d 2 c 3 a 4 b

8 1 Chemical energy – Light and thermal energies.
2 Kinetic energy – Sound energy
3 Electric energy – Light and thermal energies

9 (A) Chemical – kinetic –thermal
(B) Electric – light – thermal

10 1 Because some of the electric energy changes into thermal energy.
2 Because some of the electric energy is wasted in the form of thermal energy.
3 Because some kinetic energy changes into thermal energy due to friction.

11 1 The kinetic energy changes into thermal energy.
2 The electric energy changes into light and thermal energies.
3 The electric energy changes into kinetic energy.
4 The potential energy changes into kinetic energy.
5 They will get warm (as their temperature increases).
6 You will feel warm.
7 The chemical energy changes into kinetic energy.
8 The electric energy changes into light and sound energies.

Lesson 4

1 1 b 2 c 3 d 4 b
5 d 6 a

2 1 ✗ 2 ✓ 3 ✗ 4 ✓
5 ✓ 6 ✗

3 1 Sound energy
2 Thermal energy

4 1 c 2 d 3 b 4 a

5 1 Because it doesn't help the blender do its function.
2 Because it helps the electric heater do its function.

6 It will produce thermal energy.

Model Exam 1

Question 1

(A) 1 a 2 c 3 d 4 b

(B) Thermal energy

Question 2

(A) 1 ✓ 2 ✗ 3 ✓ 4 ✓

(B) Lamp

Question 3

(A) 1 c 2 d 3 b 4 a

(B) Because it doesn't help the device do its function.

Model Exam 2

Question 1

(A) 1 a 2 c 3 d 4 b

(B) Thermal energy

Question 2

(A) 1 ✗ 2 ✓ 3 ✗ 4 ✗

(B) Light bulb

Question 3

(A)

Device	Input Energy	Output Energy
Blender	Electric energy	Kinetic and sound energies
Kettle	Electric energy	Thermal energy
Hand bell	Kinetic energy	Sound energy

(B) The electric energy will be converted into kinetic energy.

Concept 2

Lesson 1

1. 1 d 2 b 3 d 4 c 5 c 6 d 7 b 8 d 9 a 10 d

2. 1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✗ 6 ✗ 7 ✓ 8 ✗ 9 ✗

3. 1 The Sun
   2 Gasoline pointer
   3 Gasoline
   4 Chemical energy
   5 Thermal energy

4. 1 Fossil fuel – underground
   2 gasoline pointer
   3 coal – wood 4 Oil

5. (A) 1 c 2 a 3 b
   (B) 1 b 2 c 3 d 4 a
   (C) 1 b 2 d 3 c 4 a

6. 1 gasoline pointer – fuel
   2 (1) 3 (3) 4 (2)

7. 1 Because gasoline burns inside the car's engine, the engine then rotates the wheels of the car.
   2 Because it helps the driver check the fuel in the car's fuel tank.

8. 1 The chemical energy changes into thermal energy.
   2 The car will stop.
   3 The chemical energy stored in the gasoline is converted into thermal energy.

Lesson 2

1

1 c	2 b	3 b	4 d
5 b	6 a	7 b	8 c
9 d	10 b	11 a	12 c
13 d			

2

1 ✓	2 ✗	3 ✗	4 ✗
5 ✗	6 ✗	7 ✗	8 ✗
9 ✓	10 ✓	11 ✗	12 ✓

3

1 The Sun
2 Fuel 3 Nonrenewable resource
4 Renewable resource
5 Biofuel. 6 Fossil fuel
7 Oil 8 Coal 9 Charcoal
10 Liquid fuel 11 Deforestation

4

(A) 1 wood
2 oil-underground
3 deforestation
(B) 1 heat – pressure
2 Oil – coal
3 renewable – nonrenewable
4 decreased

5

(A) 1 c 2 a 3 b
(B) 1 b 2 c 3 d 4 a

6

Renewable Resource of Energy	Nonrenewable Resource of Energy
Charcoal	Oil
Corn	Gasoline
Grass	Natural gas
Wood	Coal
Water	
Wind	

7 a (4) b (2) c (3) d (1)

8 a (2) b (4) c (3) d (1) e (5)

9

1 Oil 2 Coal
3 Charcoal 4 Coal

10 (A)

P.O.C	Fossil Fuel	Biofuel
Renewable or Nonrenewable	Nonrenewable	Renewable
Examples	Oil – Coal – Natural gas	Wood – Grass – Charcoal

(B)

P.O.C	Coal	Charcoal
Type of Fuel	Fossil fuel	Biofuel
Primary Source	Sun	Sun
Renewable or Nonrenewable	Nonrenewable	Renewable

11

1 Because they cannot be easily renewed.
2 Because it is renewed by the continuous growth of plants.
3 Because it will cause deforestation.
4 Because it is extracted from deep ground under the Earth's surface and can't be renewed easily.

12

1 They will be decomposed and turned into oil or natural gas.
2 It will cause deforestation.
3 They will be decomposed and turned into coal.

Lesson 3

1. 1 c 2 a 3 d 4 c
   5 a 6 b 7 a 8 c
   9 c 10 b

2. 1 ✗ 2 ✗ 3 ✓ 4 ✓
   5 ✗ 6 ✓ 7 ✓ 8 ✓
   9 ✗

3. 1 Renewable resources
   2 Thermal energy
   3 Electrical energy
   4 Steam 5 Turbine
   6 Generator

4. 1 steam – generators
   2 Kinetic – electric
   3 coal – natural gas

5. 1 b 2 d 3 a 4 c

6. 1 Moonlight 2 Water

7. 1 (3) 2 (1) 3 (5) 4 (4)
   5 (2)

8. 1 To reduce the burning of fossil fuel and air pollution.
   2 Because it converts the kinetic energy into electrical energy.

9. 1 It will produce thermal energy that heats water to turn it into steam.
   2 It operates turbines to produce kinetic energy.
   3 It turns into steam.
   4 It will generate electricity.

Lessons 4 & 5

1. 1 d 2 c 3 c 4 b
   5 d 6 b 7 d 8 d
   9 d 10 b 11 d 12 c
   13 d 14 a 15 d 16 d

2. 1 ✓ 2 ✗ 3 ✗ 4 ✓
   5 ✓ 6 ✗ 7 ✗ 8 ✗
   9 ✓ 10 ✓ 11 ✓ 12 ✗

3. 1 Global warming 2 Acid rain
   3 Carbon dioxide
   4 Renewable resources
   5 Nonrenewable resources
   6 Smog

4. 1 renewable
   2 temperature – climate
   3 air 4 water- soil

5. 1 b 2 d 3 a 4 c

6. a (2) b (4) c (3) d (5)
   e (1)

7.

P.O.V	Acid Rain	Global Warming
Reason of Formation	Carbon dioxide is produced from burning fossil fuel.	Carbon dioxide is produced from burning fossil fuel.
Disadvantages	1. Death of trees 2. Erosion of buildings	Increase the Earth's temperature and change the climate

8. 1 To reduce the burning of fossil fuel and pollution.
   2 Because fossil fuel can't be renewed easily.

3 Because solar energy doesn't pollute the environment.
4 Because they cause water and soil pollution.

9 1 It will cause global warming
2 Fossil fuel will run out.
3 It will dissolve the buildings' rocks.
4 It will cause air, water, and soil pollution.

Model Exam 1

Question 1

(A) 1 d 2 a 3 d 4 a
(B) Generator

Question 2

(A) 1 ✗ 2 ✗ 3 ✗ 4 ✓
(B) Charcoal

Question 3

(A) 1 b 2 c 3 d 4 a
(B) Because it takes millions of years to be formed and can't be renewed easily.

Model Exam 2

Question 1

(A) 1 d 2 c 3 c 4 a
(B) Nonrenewable energy resources

Question 2

(A) 1 ✗ 2 ✗ 3 ✓. 4 ✓
(B) Coal

Question 3

(A) a 2 b 4 c 3 d 1 e 5
(B) These remains will be transformed into coal.

Concept 3
Lesson 1

1 1 b 2 c 3 d 4 b
5 b 6 a 7 a 8 c
9 c 10 d 11 b 12 c
13 a

2 1 ✗ 2 ✓ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✗ 8 ✗
9 ✗ 10 ✗

3 1 Renewable energy resources
2 Sun 3 Concave mirrors
4 Wind turbines
5 Solar water heater

4 1 kinetic - electric
2 kinetic - electric
3 water- wind 4 Coal - oil
5 shorter 6 less
7 mirrors- sunrays
8 Greenhouses

5 1 Wind, water 2 Oil, coal

6

P.O.C	Old Windmills	Wind Turbines
Function	Grinding grain	Generating electricity
Number of Blades	More blades	Fewer blades
Height	Shorter	Taller

7 (A) 1 b 2 c 3 a
(B) 1 b 2 c 3 a

8 1 (1) 2 (1) - (2)
3 way of working
4 kinetic energy of wind

9 1 a. A concave mirror
b. It collects and focuses sunrays on metallic pots to cook food.
2 a. solar energy
b. thermal energy
c. the roof of houses

10 1 It will produce kinetic energy to grind grain and make flour.
2 It will not generate electricity.

11 1 Because it is natural resource that never runs out.
2 To grind grains to make flour.
3 To generate electricity.
4 To make their lives easier.
5 Because atmosphere, water, and the Earth's surface absorb the radiant energy of the Sun causing a rise in the Earth's temperature.
6 Because they help farmers plant the crops that only grow in a warm climate.

Lesson 2

1 1 b 2 b 3 c 4 c
5 b 6 c 7 d

2 1 ✗ 2 ✗ 3 ✓ 4 ✗
5 ✓ 6 ✗ 7 ✓ 8 ✓

3 1 Wind turbine 2 The Sun
3 Generator

4 1 warms 2 move - blow
3 kinetic - electric 4 wires
5 electric - irrigation equipment

5 a 4 b 2 c 5 d 3
e 1

6 1 It changes kinetic energy into electric energy.
2 It generates more electricity, as its efficiency increases.

7 1 Due to the difference in temperature between cold and hot air.
2 Because it converts the kinetic energy into electric energy.

Lessons 3 & 4

1 1 c 2 b 3 b 4 a
5 d 6 b

2 1 ✓ 2 ✓ 3 ✓ 4 ✗
5 ✗ 6 ✗

3 1 Generator 2 Dam
3 Hydroelectric energy

4 1 kinetic
2 Wind turbines - water turbines
3 wires
4 evaporates - condenses

5

P.O.C	Wind Turbines	Water Turbines
Location	Windy areas	On rivers and waterfalls
Similarities	• Both use renewable energy resources. • Both change the kinetic energy into electric energy.	

6 1 a. A b. potential - kinetic
2 a. a dam b. potential
c. generator - hydroelectricity

7 1 The potential energy of the water will increase.
2 Its potential energy will change into kinetic energy.

8 To control the flow of water and increase its potential energy.

Model Exam 1

Question 1

(A) 1 b 2 a 3 d 4 b

(B) Dam

Question 2

(A) 1 ✗ 2 ✗ 3 ✓ 4 ✗

(B) Because atmosphere, water, and the Earth's surface absorb the radiant energy of the Sun causing a rise in the Earth's temperature.

Question 3

1 solar water energy
2 thermal energy
3 the roof of houses

Model Exam 2

Question 1

(A) 1 c 2 d 3 c 4 a

(B) Solar heater

Question 2

(A) 1 ✗ 2 ✓ 3 ✓ 4 ✗

(B) Electricity won't be generated.

Question 3

1 b 2 c 3 a

School Book
Assess Your Learning on Unit 3

1 1 b 2 b 3 c 4 b
5 c 6 a 7 c 8 c
9 c

2 a (2) b (4) c (1) d (3)
e (5)

3 Electric energy - light energy - thermal energy

4 Turbines - Generator
Inputs: Kinetic Outputs: Electrical

Unit 4

Concept 1
Lesson 1

1 1 d 2 b 3 b 4 d
5 c 6 c 7 d

2 1 ✗ 2 ✗ 3 ✓ 4 ✗
5 ✓ 6 ✓ 7 ✗ 8 ✓
9 ✗ 10 ✓

3 1 Water 2 Canyons

4 1 changing 2 Water
3 weaker 4 very long

5 1 steep
2 quickly - very slowly
3 Wind - water
4 Coastal rocks- sandcastle

6 1 b 2 a

7 1 (1) 2 (1), (3) - (2)
3 (2)

8 1 Due to the effects of wind, water, and weather conditions.
2 Because some changes are fast and some are very slow.
3 Because it is washed away by sea waves.
4 Because water and wind may break off some parts of its rocks.

9 1 The sandcastle will disappear after a while.
2 The sandcastle will be disappeared and the coastal rocks will be the same.

Lesson 2

1

1 b	2 b	3 c	4 c
5 c	6 b	7 c	8 d
9 c	10 b	11 d	12 a
13 b	14 c	15 b	16 d
17 c			

2

1 ✗	2 ✓	3 ✗	4 ✓
5 ✗	6 ✓	7 ✗	8 ✗
9 ✗	10 ✓	11 ✓	

3

1 weathering 2 red
3 Roots 4 Oxygen
5 chemical weathering
6 wider 7 rocks

4

1 plants roots 2 Acids
3 Acid rain
4 Mechanical – chemical
5 oxygen – iron

5

1 Erosion 2 Weathering
3 Deposition
4 Mechanical weathering
5 Chemical weathering
6 Lichens 7 Oxygen
8 Root
9 Limestone cave
10 Iron

6

1 c	2 d	3 b	4 a

7

a (3)	b (2)	c (4)	d (1)

8

1 (M)	2 (C)	3 (M)	4 (C)
5 (C)	6 (C)	7 (M)	8 (C)

9

1 (4)	2 (1)	3 (3)

10

1 Because it helps you decide what to wear when you go outside.
2 Because it may cause the breaking down of statues and the peeling of buildings' paint.
3 Due to the weathering process.
4 Because the oxygen reacts with iron in a toy car, forming rust.
5 Because the oxygen reacts with iron in rocks, forming rust and breaking off rocks.
6 Because they produce acids that dissolve minerals found in rocks.
7 Because it causes the smoothing of rocks and breaks them down.
8 Because it breaks down the rocks without changing their structure.

11

1 It will rust.
2 It will smooth the rocks and break them.
3 The rocks will be weak and easy to break.
4 It will dissolve minerals in rocks, causing them to break off.
5 It will cause chemical weathering by dissolving minerals that recombine, forming new substances.
6 Acid will eat away rocks so they become weaker and break down easily.
7 The cracks become wider, so the rock breaks down.

Lesson 3

1

1 c	2 b	3 b	4 b
5 b	6 d	7 c	

2

1 ✓	2 ✗	3 ✓	4 ✓
5 ✗	6 ✓		

3

1 chemical 2 long
3 mechanical 4 mechanical

4 1 Chemical – mechanical
2 matter 3 breaks down
4 long

5 1 Chemical weathering
2 Mechanical weathering

6 1 Because the biscuit is broken into small pieces, but it is still same material.
2 Because it produces a completely different new substance "dough".
3 Because chemical weathering causes a completely new different matter.

7 1 The material will not change and mechanical weathering occurs.
2 The materials will change and chemical weathering will happen.

Lessons 4 & 5

1 1 b 2 d 3 a 4 c
5 c 6 c 7 b 8 a
9 d 10 a

2 1 ✓ 2 ✓ 3 ✗ 4 ✗
5 ✗ 6 ✗ 7 ✗ 8 ✓
9 ✗ 10 ✓ 11 ✓ 12 ✗

3 1 Erosion 2 Gravity
3 River 4 Deposition
5 Delta

4 1 gentle wind – hurricane – Egyptian Western Desert
2 Nile delta 3 water
4 deposition

5 1 c 2 b 3 a

6 1 Weathering 2 Deposition
3 Deposition 4 Erosion
5 Deposition 6 Erosion

7 1 Because it pulls broken rocks down mountainsides.
2 Due to the deposition of sand carried by the wind.
3 Because deposition occurs when eroded sediment stop moving.

8 1 Rain washes the soil, causing erosion.
2 Sand will be deposited, forming sand dunes.
3 It will form a delta.

Model Exam 1

Question 1

(A) 1 c 2 b 3 d 4 c
(B) It will form a red -rust layer on rocks.

Question 2

(A) 1 ✓ 2 ✗ 3 ✓ 4 ✓
(B) Because oxygen gas reacts with iron found in rocks.

Question 3

(A) 1 rocks
2 Limestone caves
3 weathering 4 expands
(B) Lichens

Model Exam 2

Question 1

(A) 1 b 2 d 3 a 4 c
(B) Erosion

Question 2

(A) 1 ✗ 2 ✗ 3 ✗ 4 ✓
(B) Digestion

Question 3

(A) 1 d 2 a 3 b 4 c
(B) It will dissolve minerals of the rocks so the rocks become weaker and break down easily.

Concept 2

Lesson 1

1 1 c 2 c 3 c 4 a
5 b 6 d

2 1 ✓ 2 ✗ 3 ✗ 4 ✗
5 ✓

3 1 Canyon
2 Wadi Nakhr canyon
3 Colored Canyon

4 1 impression
2 brown and black colored
3 V-shaped
4 small canyon – water stream

5 1 c 2 b 3 a

6 1 Gravity

7 1 canyon – million
2 Weathering – erosion

8 1 Because a stream of water may have formed it.
2 Because they have different rocks, texture, and color.

9 1 It will leave impression and may form a small canyon.
2 The small canyon will get deeper.

Lesson 2

1 1 a 2 b 3 b 4 c

2 1 ✗ 2 ✓ 3 ✗ 4 ✓
5 ✓ 6 ✗

3 1 Weathering 2 erosion
3 deposition 4 many years

4 1 c 2 b 3 a

5 1 Because it helps us predict the future changes of landforms.
2 Because the river path may change and cause erosion and deposition of the house.

6 1 The house may get eroded.

Lesson 3

1 1 b 2 c 3 a 4 b
5 d 6 b 7 c 8 a
9 d

2 1 ✗ 2 ✓ 3 ✗ 4 ✓
5 ✓ 6 ✗ 7 ✗ 8 ✓
9 ✓ 10 ✓ 11 ✗

3 1 Gravity 2 Canyon
3 The Grand Canyon
4 Rivers

4 1 gravity
2 increases – more
3 less 4 sediments
5 high – many layers

5 1 ✗ 2 ✓ 3 ✓ 4 ✓

6 1 Because they are formed due to the erosion by rivers or streams.
2 Due to the gravity.

7 1 A canyon may be formed.
2 The water speed increases causing more erosion.
3 The water of the river will cause more erosion.

Lessons 4 & 5

1 1 d 2 d 3 d 4 a
5 b 6 d 7 c 8 b
9 b 10 a

2 1 ✓ 2 ✗ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✗ 8 ✗
9 ✗ 10 ✗ 11 ✓ 12 ✗

3 1 Silts 2 Delta
3 Mediterranean Sea
4 Wind erosion 5 Sand dune

4 1 canyon – delta 2 fan
3 decreases – deposition
4 increases

5 1 b 2 d 3 c 4 a

6 1 delta – deposition
2 area "C" 3 area "B"

7 1 A 2 B

8 1 Because wetland plants slow down water and increase deposition rates.
2 Because river water speed decreases.
3 Because wetland plants are responsible for slowing down the water.
4 Because sand dunes are formed when a barrier like a rock blocks the wind.

9 1 A delta is formed.
2 Sand grains will be deposited forming sand dunes.
3 Sand grains are blown from South to North direction.

Model Exam 1

Question 1

(A) 1 c 2 a 3 a 4 d
(B) The canyon will get deeper and becomes a bigger canyon.

Question 2

(A) 1 ✓ 2 ✓ 3 ✗ 4 ✗
(B) Because the river may change its path and erode the house.

Question 3

(A) 1 sand dune
2 delta – sediments
3 less
(B) Canyon

Model Exam 2

Question 1

(A) 1 b 2 c 3 d 4 a
(B) Weathering and erosion

Question 2

(A) 1 ✗ 2 ✗ 3 ✓ 4 ✗
(B) Gravity

Question 3

(A) 1 b 2 a 3 d 4 c
(B) The sediments will be deposited and form a delta.

School Book
Assess Your Learning on Unit 4

1 1 d 2 d 3 b 4 b
5 a 6 b 7 c 8 a
9 b 10 a 11 c

2 1 Erosion of water (Valley)
2 Deposits of water (Delta)
3 Erosion and deposition due to wind (Sand dune)

Final Revision Model Answers

Unit 3

Concept 1

1

1 b	2 a	3 c	4 c
5 b	6 d	7 b	8 c
9 b	10 d	11 a	12 a
13 c	14 b	15 d	

2

1 ✓	2 ✗	3 ✗	4 ✗
5 ✓	6 ✗	7 ✓	8 ✓
9 ✗	10 ✓	11 ✓	12 ✗
13 ✓	14 ✓		

3

1. Mars Curiosity Rover
2. Chemical energy
3. The Sun
4. Thermal energy
5. Chemical energy
6. Energy chain
7. Electric lamp
8. Thermal energy
9. Kinetic energy
10. Sound energy
11. Thermal energy
12. Thermal energy
13. Copper
14. Thermal energy

4

1. heat
2. sound – kinetic
3. Coal
4. electrical – output
5. electrical

5

1. Lamp
2. Light bulb

6

(A) 1 a	2 c	3 b		
(B) 1 d	2 c	3 a	4 b	
(C) 1 d	2 c	3 a	4 b	
(D) 1 c	2 d	3 b	4 a	

7

1 Kinetic	2 (1)	
3 (1) – (3)	4 (3)	5 (2)

8

(A) Chemical – kinetic – thermal

(B) Electrical – light – thermal

9

1. Because the robot is very far from any store or any plug.
2. Because when the wood of the trees is burned, chemical energy stored in wood is changed into thermal energy.
3. Because the chemical energy stored in the food is converted into kinetic energy that helps your body move.
4. Because electrical energy changes into light and heat energies.
5. Because sound energy doesn't help the blender do its main function.
6. Because thermal energy helps the electric heater do its main function.

10
1. Kinetic energy changes to thermal energy.
2. Electrical energy changes into light and thermal energies.
3. Electrical energy changes into kinetic energy.
4. Some of the produced energy is lost in the form of heat.

Concept 2

1

1 d	2 c	3 d	4 a
5 b	6 d	7 a	8 a
9 c	10 d	11 a	12 a
13 c	14 c	15 c	16 d
17 b	18 a	19 d	

2

1 ✗	2 ✓	3 ✓	4 ✗
5 ✗	6 ✗	7 ✗	8 ✓
9 ✓	10 ✗	11 ✓	12 ✓
13 ✗	14 ✓	15 ✗	16 ✗
17 ✗			

3
1. Gasoline pointer
2. Gasoline
3. Chemical energy
4. Thermal energy
5. Fuel
6. Nonrenewable resource
7. Renewable resource
8. Biofuel
9. Fossil fuel
10. Oil (Natural gas)
11. Coal
12. Charcoal
13. Liquid fuel
14. Electrical energy
15. Turbine
16. Generator
17. Global warming
18. Acid rain
19. Carbon dioxide

4
1. wood – coal
2. temperature – pressure
3. renewable – nonrenewable
4. steam – generators
5. kinetic – electrical
6. renewable
7. air
8. water – soil

5
1. wood
2. oil – underground
3. deforestation

6

(A) 1 b	2 c	3 d	4 a	
(B) 1 c	2 a	3 b		
(C) 1 b	2 c	3 d	4 a	
(D) 1 b	2 d	3 a	4 c	

7
1. Oil
2. Coal
3. Charcoal

8
1. To help the driver check the amount of gasoline (fuel) left in the car's fuel tank.
2. Because it starts to run out as we use it and can't be renewed easily.
3. Because it is renewed with the continuous growth of plants.
4. Because generators convert kinetic energy into electrical energy.

5 Because it takes millions of years to be formed and starts to run out as we use it and can't be renewed easily.

6 To reduce the burning of fossil fuels in normal vehicles and reduce air pollution.

9

1 Chemical energy changes into thermal energy.

2 It leads to deforestation.

3 It produces thermal energy that changes the water into steam.

4 It turns into steam.

5 It may cause the decomposition of some rocks, including bricks of buildings.

Concept 3

1

1 b	2 d	3 b	4 a
5 c	6 a	7 b	8 b
9 d	10 b	11 b	12 d

2

1 ✗	2 ✓	3 ✗	4 ✗
5 ✗	6 ✓	7 ✗	8 ✗
9 ✗	10 ✗	11 ✗	12 ✓
13 ✓	14 ✗	15 ✗	

3

1 Renewable energy resources

2 Concave mirrors

3 Wind turbine

4 Solar heater

5 Generator

6 Dam

7 Hydroelectric energy

4

1 kinetic – electrical

2 kinetic – electrical

3 less

4 mirrors – sunrays

5 Greenhouses

6 move – blow

7 wires

5 1 b 2 c 3 a

6

1 (1)

2 (1) – (2)

3 their ways of working

4 the kinetic energy of the wind to be operated.

7 a 4 b 2 c 5 d 3 e 1

8

1 To grind grains to make flour.

2 To generate the electricity needed to light houses and operate different devices.

3 Because the atmosphere, water and soil absorb heat energy from the Sun.

4 Because they help farmers in planting crops that need warm weather.

5 Because it changes the kinetic energy to electrical energy.

6 To control the flow of water and increase the gravitational potential energy of water to generate electricity.

9 1 The wind turbines will not move, so they can't generate electricity.
2 They will rotate faster and produce more electrical energy.
3 The gravitational energy of water changes into kinetic energy to rotate the water turbines and generate electricity.

Unit 4

Concept 1

1

1 c	2 d	3 b	4 c
5 c	6 d	7 a	8 b
9 c	10 b	11 d	12 b
13 d	14 a	15 c	16 a

2

1 ✓	2 ✗	3 ✓	4 ✗
5 ✗	6 ✗	7 ✗	8 ✗
9 ✓	10 ✓	11 ✓	12 ✗
13 ✓	14 ✓	15 ✗	

3
1 Canyons
2 Erosion process
3 Deposition process
4 Chemical weathering
5 Lichens
6 Oxygen gas
7 Chemical weathering
8 Mechanical weathering
9 Gravity
10 River's water
11 Deposition process
12 Delta

4 (A)
1 plant roots
2 Acids
3 Acid rain
4 Mechanical – chemical
5 oxygen – iron

(B)
1 gentle wind – hurricane – Egyptian Western Desert
2 Nile Delta
3 water
4 deposition

5 1 c 2 d 3 b 4 a

6 1 (4) 2 (1) 3 (3)

7
1 Because of many factors, such as wind, water and weather.
2 Because oxygen gas can react with the iron in the rocks forming red-colored rust, which makes the rock weaker and break down easily.
3 Because they produce acids on rocks that makes the rock weaker and breaks down easily.
4 Because chemical weathering changes the rocks structure and forms a new matter, while mechanical weathering doesn't change the rocks structure.
5 Because eroded rocks must be deposited after some time.

8
1 The rocks become weaker and break down easily.
2 Acid rain will dissolve the minerals in rocks, so they become weaker and can be broken off more easily.

3 The acids cause the breaking down of rocks.

4 The cracks become wider, so the rocks break down easily.

Concept 2

1 1 c 2 c 3 a 4 a
5 b 6 c 7 b 8 d
9 c 10 a 11 d 12 d
13 d 14 c 15 b 16 a

2 1 ✗ 2 ✗ 3 ✓ 4 ✓
5 ✗ 6 ✗ 7 ✗ 8 ✓
9 ✓ 10 ✗ 11 ✗ 12 ✗
13 ✗ 14 ✗ 15 ✓ 16 ✗

3 1 Canyon
2 Gravity
3 The Grand Canyon
4 Rivers (Streams)
5 Silt
6 Delta
7 Erosion

4 (A) 1 impression
2 brown and black-colored
3 V-shaped
4 small canyon – water stream

(B) 1 gravity
2 increases – more
3 less
4 sediments
5 high – layers

(C) 1 canyon – delta
2 fan
3 decreases – deposition
4 increases

5 (A) 1 a 2 b 3 c
(B) 1 b 2 d 3 c 4 a

6 Gravity

7 1 ✗ 2 ✓ 3 ✓ 4 ✓

8 1 delta – deposition
2 area "C" 3 area "B"

9 1 A 2 B

10 1 Because the river may change its path and cause erosion and deposition of the house.
2 Because they are formed due to erosion by rivers or streams.
3 Due to the erosion and deposition of the wind-blown sand.

11 1 It may form a small canyon.
2 This small canyon becomes deeper.
3 They will form a river causing more erosion.
4 Sediments will be deposited forming a delta.
5 Sand is deposited forming a sand dune.

Government Model Exams Answers

1 Cairo Governorate – Exam 1

Question 1

(A) 1 d 2 b 3 c 4 c

(B) A small canyon may be formed.

Question 2

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) Due to the reaction with oxygen causing chemical weathering.

Question 3

(A) 1 thermal 2 warm
3 chemical 4 gravity

(B) Solar energy

2 Cairo Governorate – Exam 2

Question 1

(A) 1 a 2 c 3 c 4 c

(B) The sediments will be deposited forming a delta.

Question 2

(A) 1 ✗ 2 ✗ 3 ✓ 4 ✗

(B) Because they mix with the water in the canals causing water and soil pollution.

Question 3

(A) 1 sand dune 2 weathering
3 natural gas 4 valley

(B) Natural gas

3 Cairo Governorate - Zeitoun Zone

Question 1

(A) 1 b 2 a 3 b 4 b

(B) Chemical weathering - Mechanical weathering

Question 2

(A) 1 ✗ 2 ✗ 3 ✓ 4 ✓

(B) Wind, water, and the gravity

Question 3

(A) 1 Canyon 2 Fossil fuel
3 Law of Conservation of Energy
4 Dams

(B) Delta

4 Cairo Governorate - Al-Azhar Al-Sharif

Question 1

1 c 2 b 3 b

Question 2

1 b 2 d 3 c

Question 3

1 ✓ 2 ✓ 3 ✗

Question 4

1 Biofuel
2 Kinetic energy 3 Weathering

Question 5

1 wood 2 Water
3 electrical

11 Alexandria Governorate – Exam 3

Question 1

(A) 1 c 2 a 3 c 4 b

(B) To conserve electricity.

Question 2

(A) 1 Digestion 2 Glass
3 Acid rain 4 Fossil fuel

(B) Acids will eat away rocks so they become weaker and are broken down easily.

Question 3

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) Fuel

12 Dakahlia Governorate

Question 1

(A) 1 chemical 2 Natural gas
3 Canyons 4 Deposition

(B) It will dissolve the minerals in the rocks, so the rocks become weaker and break down easily.

Question 2

(A) 1 ✓ 2 ✗ 3 ✓ 4 ✗

(B) Friction occurs between sand grains carried by wind and rock.This causes smoothing of rocks and breaking them down.

Question 3

(A) 1- 1 Law of Conservation of Energy
2 Oxygen gas
2- 1 Electrical energy – Thermal energy
2 Chemical energy – Kinetic energy

(B) To control the water flow and increase its potential energy.

13 Suez Governorate

Question 1

(A) 1 b 2 d 3 d 4 a

(B) Because it reacts with the oxygen of the air.

Question 2

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) Charcoal

Question 3

(A) 1 gently 2 Oil
3 renewable 4 deposition

(B) A delta will be formed.

14 Port Said Governorate

Question 1

(A) 1 d 2 a 3 d 4 a

(B) Weathering

Question 2

(A) 1 ✗ 2 ✗ 3 ✗ 4 ✓

(B) Because iron reacts with oxygen.

Question 3

(A) 1 Mars 2 renewable
3 rocks 4 increases

(B) A canyon will be formed.

15 Behira Governorate

Question 1

(A) 1 c 2 b 3 a 4 b

(B) Law of Conservation of Energy

Question 2

(A) 1 ✗ 2 ✓ 3 ✓ 4 ✓

(B) Irritation of eyes and lungs – Damage of lungs – Heart diseases

Question 3

(A) 1 c 2 a 3 d 4 b

(B) Generator

5 Giza Governorate – Exam 1

Question 1

(A) 1 c 2 a 3 b 4 a

(B) oxygen

Question 2

(A) 1 ✓ 2 ✓ 3 ✓ 4 ✗

(B) Sediments will be deposited forming a delta.

Question 3

(A) 1 water 2 biofuel
3 Sun 4 sound

(B) Acid rain

6 Giza Governorate – Exam 2

Question 1

(A) 1 ✗ 2 ✓ 3 ✓ 4 ✗

(B) the erosion and deposition of the wind-blown sand

Question 2

(A) 1 b 2 a 3 c 4 c

(B) delta

Question 3

(A) 1 c 2 a 3 d 4 b

(B) weaker and break down easily.

7 Giza Governorate – Exam 3

Question 1

1 Chemical energy
2 Global warming
3 Electrical energy
4 Sand dunes 5 Lichens

Question 2

1 ✗ 2 ✗ 3 ✓ 4 ✓
5 ✗

Question 3

(A) 1 c 2 a 3 b

(B) 1 Solar water heater
2 solar – thermal

8 Qalyubiyya Governorate

Question 1

(A) 1 d 2 b 3 b 4 b

(B) Photosynthesis

Question 2

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) Chemical weathering

Question 3

(A) 1 d 2 c 3 b 4 a

(B) Oil - Nautural gas

9 Alexandria Governorate – Exam 1

Question 1

(A) 1 b 2 d 3 d 4 a

(B) As they grow inside rock cracks, the cracks become wider, causing breaking down of rocks.

Question 2

(A) 1 thermal 2 smog
3 mechanical 4 erosion

(B) It will cause chemical weathering.

Question 3

(A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) Fossil fuel

10 Alexandria Governorate – Exam 2

Question 1

(A) 1 charcoal 2 Sun
3 electric lamp 4 copper

(B) ✓

Question 2

(A) 1 a 2 d 3 b 4 b

(B) Sound energy

Question 3

(A) 1 c 2 d 3 a 4 b

(B) Because it reacts with oxygen.